



AGRICULTURAL RESEARCH INSTITUTE
PUSA

NATAL
DEPARTMENT OF AGRICULTURE
VOLUME XIV.
JANUARY—JUNE, 1910.
THE NATAL
Agricultural Journal.

Published for and Edited in the Department of Agriculture.



Publishers :
THE "TIMES" PRINTING AND PUBLISHING COMPANY, LIMITED.
1910.

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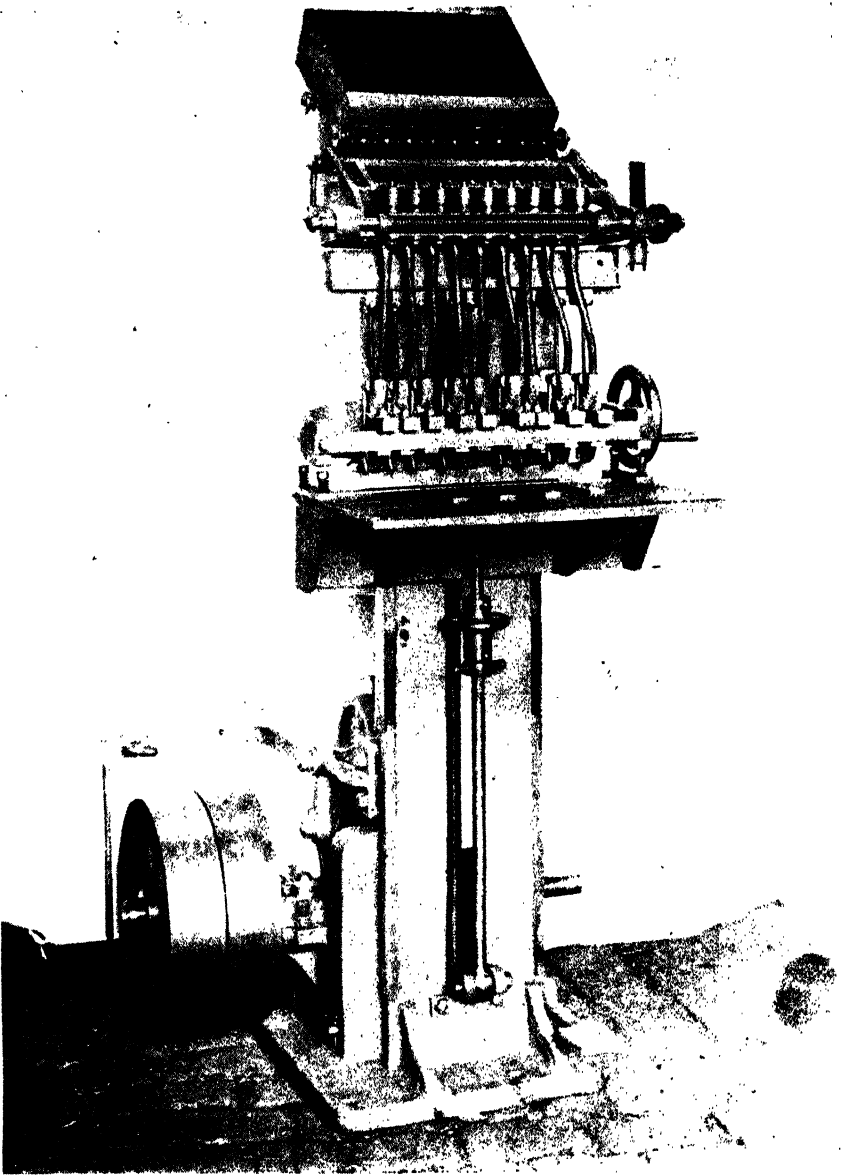
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HAWLEY'S BOX-NAILING MACHINE.
(See "Notes and Comments.")

The Natal Agricultural Journal.

Natal Maize Products in England.

THE possibilities which are before Natal in the direction of the development of a large export trade in our staple product—maize—have formed the subject of many articles in the pages of this *Journal* and in the columns of the daily press of the Colony, and of innumerable speeches by public men, since the inception of the idea in the brain of our Minister of Agriculture of creating an oversea export trade in this grain. The great returns from which the development of an increasingly large export trade in this commodity must accrue to this country and the general benefits all round which this Colony must derive from such a trade, have been dilated upon by writers and speakers large and small from the day when the proposal was first publicly announced by the Government, and the forecasts of all these writers and speakers are in a fair way to being realised; in fact, many of them have already proved themselves to be correct, and we can now safely say that a regular export trade in maize has been developed, although there is still a very great deal of room for further extension; in fact the present trade, large though it is when compared with the very small trade which existed prior to the year 1907, is really merely in a state of infancy, for, with a sub-continent such as ours, having millions of acres available for the cultivation of maize, the possibilities of extending this export trade may be regarded from our present stage as practically unlimited. Our export trade in this grain is, as we have said, still in its infancy, but it already exists as a more or less organised business, and that is a great step accomplished. Its commercial organisation, whilst it is not as fully developed as might be con-

sidered desirable, is nevertheless no worse than might have been expected, considering the brief space of time it has had in which to develop itself. Matters in this direction, however, are being put right, and the conference at Bloemfontein which has been sitting during the month on this subject will help to place matters on the organised footing which a trade that has such immense possibilities as an export trade in maize, requires, even at what is really only the beginning of things.

On the Continent of Europe and in the United Kingdom South African maize in general, and Natal maize in particular, has found great favour with dealers, taking a prominent place among the leading mealies of the world, and there is now a large and increasing demand for our grain oversea—which, in other words, means that there is a good market for our mealies which will take all that we are able to send it for years to come.

So far we have been referring only to the whole grain—or rather to the market which exists for maize for stock feeding and distilling purposes. There is, however, another direction in which mealies can be used and which may, with judicious advertising, result in the development in time to come of a further large demand for our mealies. We refer to the use of maize as human food in the form of meal. Maize meal (or, as it is better known in South Africa, mealie meal) is very largely used in this country for porridge purposes among all classes of the population and forms the staple food of the natives. To create a liking in the United Kingdom for this cheap yet nutritious food will mean the extension of the market for our mealies to a very considerable degree; in fact so great is the population of England—taking that country alone—that if only a small proportion of that population can be induced to include maize meal among their breakfast dishes, a very large amount of maize would thereby be absorbed.

It is a realisation of these facts and of the possibilities in this direction that has caused the Government, through the Natal Government Agency in London, to take up the matter of creating a demand in the United Kingdom for maize products, and maize meal especially; and Mr. Harrison, the Commercial Agent, has, with his characteristic energy, been taking the matter up and doing his best to create the desired demand. A number of samples of meal were supplied to him, and by him judiciously distributed amongst various institutions and to various individuals. Mr. Harrison has furnished to the Minister of Agriculture a report on what he has so far accomplished in the direction of advertising Natal maize meal, and we have this report before us as we write. To begin with Mr. Harrison states that samples of meal were distributed amongst 265 Cookery and Housewifery Centres established under the auspices of the London County Council. Reports from these centres have not yet been received; but the Commercial Agent is of the opinion that

if they are satisfactory and the Council is willing to have the meal adopted in the schools, the best plan will be for the London agents of the Natal millers to put themselves in touch with the grocers in the various centres so that the meal can be purchased by the schools.

Of the other directions in which experiments have been made and the meal distributed, particular mention may be made of the following:—

(1) M. Escoffier, the chef of the Carlton Hotel in London, has taken very great interest in the efforts of the Natal Government to establish maize meal in England. He states that he has ever been solicitous in encouraging the use of cheap, and at the same time nutritive, dishes by the working classes, and is most enthusiastic regarding the food possibilities of maize meal; and he has promised his assistance in the direction of encouraging the use of this food. In an interview with the Commercial Agent, M. Escoffier entertained no doubt whatever as to the utility and wholesomeness of maize as a form of diet. He was quite sure it had but to be known to be appreciated, and expressed himself willing to include it on the menu of the Carlton. That the leading chef of Europe should be willing to offer South African maize to the patrons of that high-class and exclusive establishment, where nothing but the choicest of fare is placed before the guests, is proof enough of the excellence of the commodity. Naturally at the tables of such an establishment the maize would be subjected to the very best culinary treatment, the question of expense being of no importance. But as a *food for the million* M. Escoffier was equally convinced of the suitability of maize meal. It could, he said, be used in many simple and economical styles. In many instances it would be a useful substitute for bread, and should also take the place of Yorkshire pudding—thereby providing a welcome variation. To advertise more fully the uses of maize meal the chef suggested that pamphlets with full directions for the cooking of it be circulated among middle-class and poorer householders, the ordinary English woman being singularly deficient in her knowledge of plain cooking. For the well-to-do there were innumerable methods of making maize the basis of savoury dishes, such as garnish milk cheese, sauces and butter in various forms. That, of course, would not appeal to the great bulk of the population, and therefore could not be counted on as an important factor in increasing the sale of or popularising maize meal to any great extent. It was the great middle and lower classes who must be acquainted with its merits, uses, and, above all, cheapness. There was much scope for the development of cheap and useful cookery in England, and maize would, in his opinion, provide an excellent object lesson.

(2) Mr. Eustace Mills, the well-known food reformer, has experimented with the meal, and he was in fact the first to demonstrate the possibilities of maize meal as bread. He has received good reports on the meal made up into various dishes.

(3) A large sample of the meal was sent for trial to Dr. Barnardo's Homes and was much appreciated. Given a price under that of oatmeal, it should, Mr. Harrison is of the opinion, have the advantage.

(4) Samples were also distributed amongst 100 Church of England Homes for Waifs and Strays. The reports received were very encouraging and have elicited applications for the meal, which applications may be referred to at the Commercial Agent's Office in London by Natal millers' agents in London.

(5) The Church Army Social Depot was also presented with a quantity of the meal, and the men liked it.

(6) The Social Wing of the Salvation Army, while appreciating the Government's action, do not report satisfactorily. The men of the Homes do not appear to care for the meal very much.

(7) A pretty wide distribution was made among railway hotels, but here again some liked the meal, others did not, and some would not take the trouble to give it a fair trial.

(8) An effort was made, through the Home Office, to get the Prison Commissioners to introduce the meal as prison diet. An experiment was made at Wormwood Scrubs Prison, but without success up to the present.

(9) Through the agency of the "Order of the Golden Age," a vegetarian and fruitarian institution, samples of the meal were circulated and a notice regarding the good qualities of the meal was published by the journal of the institution. This produced many enquiries for the meal, and the Director has rendered valuable aid in popularising the meal, and is prepared to do so to a greater extent when supplies are available for sale.

(10) Mention should also be made of the good work which has been done by Mrs. C. E. Humphrey—"Madge" of *Truth*, who also conducts "The Art of Good Living" in the *Gentlewoman*—in drawing attention to the meal. In both of these journals appreciative notices have appeared.

(11) Mr. Harrison is also endeavouring to get the meal introduced into some of the London workhouses. He considers that the meal would have to be delivered at 1d. per pound.

(12) Samples of the meal have also been distributed amongst householders and doctors, and Mr. Harrison has received many flattering opinions.

These are some of the principal directions in which Mr. Harrison has endeavoured to advertise our meal in England, and it will be seen that he has not spared any pains to this end. As regards the manner in which the meal should be done up for sale in the United Kingdom, Mr. Harrison has some useful suggestions to offer. The meal may be packed either in bags or in packets. If it is to be put up in bags, Mr. Harrison recommends the use of bags containing 3½ lbs., 7 lbs., 14 lbs., and 56 lbs., the bags being got up in the same way as millers in the

United Kingdom put up the best oatmeal. So far as the packet food is concerned there are, Mr. Harrison points out, three alternatives, viz., (a) the meal may be artificially flavoured, with added ingredients; (b) the maize may be rolled like Quaker Oats and Rolled Oats; and (c) the maize may be flaked and carefully cooked ready for immediate eating.

It needs very little thought to be convinced that there is a considerable market awaiting us for mealie meal and other mealie products in the United Kingdom, but a great deal of advertising will be necessary on the part of any firm or company who might take the matter up, and this is a point which Mr. Harrison has laid stress upon in his report. The placing of Natal maize products on the English market is, however, a proposition which will bring a good return to any company having the necessary organisation for the successful exploiting of the market. Thus much is evident from Mr. Harrison's report upon what he has done so far, and any new light which he is able to throw upon the subject in a later report will be welcome.

Go quietly among the poultry, never allowing them to become scared, teaching them that you are their friend, and they will soon show entire confidence in you.

Farmers and others desiring price lists and information regarding butter churns may obtain same, on stating their requirements, from the Commercial Intelligence Bureau, Office of the *Agricultural Journal*, Pietermaritzburg.

LATE MOULTING.—When hens moult very late they eat much less than if it were earlier in the season on account of the cold affecting them so much. When they are well looked after they get their feathers half as quickly again as if left to themselves. They should not be fed more than twice a day (morning and afternoon), unless a little corn is covered up in the peat or chaff at mid-day to afford employment. Two hens will do well in a coop two feet square, if they do not pluck the feathers from each other. When this is the case, they should be put up separately, as when the young quills are shooting they are a temptation to them, especially if in a small coop or run.



Castor Oil.

WE have received an enquiry from a large firm in Johannesburg as to whether Natal-grown castor oil is obtainable in quantity in Durban, and, if so, at what price. So far as we are aware large quantities are not obtainable, but we should be glad to hear from any of our readers who may be in a position to supply this commodity. Our correspondents inform us that if the oil is cheap they think they could take from 40 to 100 gallons per month throughout the year. This is a good opportunity for anyone who may be about to go in for castor oil production, and we should be very glad to hear that this firm's requirements can be fulfilled from Natal. The castor oil plant grows wild in great profusion on the coast, and it has often struck us as strange that no one apparently has ever taken up crushing on a commercial scale.

The Malze Conference.

The Conference on maize export matters which has been sitting at Bloemfontein has now ended its deliberations, and summaries of its conclusions have appeared in the columns of the daily press. We hope to be in a position shortly to present our readers with the full text of the resolutions passed.

Fruit Export.

All readers of the *Journal* who have followed the reports which have from time to time appeared in our pages on the prospects of the development of an export trade in fruit from South Africa to England and on the market which exists in England are well acquainted with the name of Mr. T. J. Poupart, the enterprising Covent Garden salesman who has handled much of the fruit sent from Natal in the past. Readers actively interested in the export of fruit will doubtless be glad to hear that Mr. Poupart has appointed a South African representative in Durban, in the person of Mr. A. J. Pallent. Mr. Pallent's postal address is P.O. Box 110, Durban, and he has also an office at Port Elizabeth (his postal address at which place is Box 421).

Surra.

In view of the existence of the disease known as "Surra" in certain countries on or contiguous to the Asiatic Continent, a Proclamation was issued just after we went to press with our December issue, prohibiting the importation, directly or indirectly, into the Colony of Natal, of all animals from the following countries and islands, viz.:—Persia, British Burmah and Assam, China and bordering countries, including Korea, French Indo-China, Hong-Kong, Federal Malay States, Dutch East Indies, and the Philippines. The penalty prescribed for contravention of this Proclamation is a fine not exceeding £50, with the alternative of imprisonment, with or without hard labour, not exceeding three months, in respect of every animal imported.

A Box-Making Machine.

Particulars have been received by the Department of Agriculture, from the Agent-General for Natal in London, of a patent box-nailing machine which is being manufactured by Messrs. James Hawley, Ltd., Derby Works, Carruthers Street, Liverpool, and which will doubtless interest some of the readers of this *Journal*, especially in view of the strides which the box-making industry is making in this country. A photo of the machine has also been received, a reproduction of which will be found in the present issue of the *Journal*. The machine, fitted with automatic feed, is extremely simple in construction, and is claimed to be the strongest and most reliable in the market. It is universal in design, and so can be adapted to the making of any construction of box, both framing up and bottoming, which enables it to meet all the requirements of packing-case makers.

In practice, the wood is automatically and rigidly clamped whilst being nailed, by means of a rising and falling table, which at the same time adjusts itself to suit slight inequalities in the thickness of boards. The nail feed is so designed as to render it impossible for more than one nail to pass into the box at one time, and to ensure a nail being taken with each stroke. It is also fitted with a safety device, so that crooked or badly-formed nails are not allowed to pass, thus preventing a breakage. The machines are also fitted with a positive friction clutch, which can be belted from above or below, or fitted direct with an electric motor, as may be desired. By a very simple and quick movement the machine can be made to do straight nailing, zigzag nailing, alternate straight and zigzag nailing, and cleating. No skilled labour, it is stated, is required to operate the machine; and we may remark, in conclusion, that any description or size of wood box can be dealt with, from small cigar boxes up to long packing cases for linoleum, iron sheets, or orange boxes.

Beekeepers' Association Notes.

We regret to have to inform our readers that Mr. W. C. Mitchell, the Government Apiarist at Cedara, has been ill in bed, as a consequence of which he has not been able to prepare the usual notes of the Natal Beekeepers' Association for publication in this issue. His many friends will, we are sure, join with us in wishing him a speedy return to good health. Beekeepers' interests are, however, not altogether neglected in this issue, Mr. Martin having favoured us with an article on apiculture which will be read with interest by all engaged in this fascinating and profitable hobby, whilst Miss Ritchie continues her valuable articles on "The Living Bee."

Help from Readers.

We have to thank Mr. Thos. L. Clarence, of Alderley P.O., via Richmond, for very kindly drawing our attention to some interesting notes in the "Science and Arts" section of a recent issue of *Chambers's Journal*, dealing respectively with "A Handy Sack-Holder," "The Food Value of Peas," and "Trapping Moths by Electric Light." We are reproducing these notes in the present issue of the *Journal*, as we think they will be read with interest by many of our readers. We are always glad to have our attention drawn to articles and notes of interest to farmers appearing in publications which we do not happen to see regularly, and we shall always be pleased to hear from any of our readers in this connection. It is our aim to make the *Journal* a real farmers' publication, and our readers can do much to help us attain this desirable end.

A Handy Sack Holder.

Those who have to despatch their produce in sacks, especially milers, lime-burners, and so forth, readily realise the difficulties attending the charging of the bags. One man or boy has to be deputed to hold the mouth of the sack open while it is being filled. An ingenious means of overcoming this difficulty has, we learn from *Chambers's Journal*, been effected by an engineer attached to one of our large gasworks, where the uneconomical labour conditions attending the prevailing system were recognised, and caused him to devise a highly efficient and simple mechanical holder. It comprises a small stand, upon which is mounted an upright pillar. Upon this pillar slides a collar carrying a lever. The longer end of the lever serves as the handle, and the shorter length the sack-holder. The bag is held in the distended position by two rings hinged together. The sack is placed through the lower ring and the mouth pressed over the rim all round. The upper ring is then lowered, and by means of a series of short spikes which pierce the sacking and pass

through holes in the lower ring when it is pressed down the bag is held wide open. When the bag is filled the upper ring is simply swung back and the mouth of the sack left free for tying or sewing up. The apparatus is strongly made, is inexpensive, and easily operated, while it can be adjusted to handle any capacity of sack.

An Oversight.

In the article on Farming Implements and Machinery which appeared in our last issue, by an oversight Messrs. Steel, Murray & Co.'s name was not mentioned in referring to Ransomes's R.Y.L. and E.C. ploughs. It was intended that farmers should know who were the agents for all the different ploughs described, but through an unintentional oversight no mention was made of the fact that Messrs. Steel, Murray & Co. are the sole agents for these particular ploughs. A large number of our readers who have been engaged in farming for many years probably do not need to be enlightened on this point, but there are probably many others, also, who have only been farming for a comparatively short time to whom, therefore, it is due that the agents, not only for these ploughs, but also for all the other makes described, should be mentioned.

Magnetism and the Sugar Mill.

The many cane mills that are broken down annually by the accidental or malicious introduction of iron into the mills lead to the most extreme care to prevent such accidents, but still they do occur, and frequently the results are very serious. Coupling pins of the standard gauge cars, coupling links and odd pieces of iron that may lie around sugar factories in some unconscionable way get into the cane carrier and go on to the mill. The use of chain slings and of the slings with hooks has also led to many disasters in this way, and now, we learn from *The Louisiana Planter*, Mr. L. von Tresckow, the well-known manager of the Lafayette sugar factory, has conceived the idea of applying electro magnetism directly to the chute that leads the incoming cane into the crusher or into the mill. Mr. von Tresckow, with the aid of Mr. E. A. Sammons, has designed an apparatus which they call the "Dixie Electro Magnet," and this was tried last season at the Lafayette factory and proven to be a perfect success. One was installed also at the Rose Hill sugar factory in Vermillion Parish, and the results were very satisfactory there. The iron or steel floor and sides of the chute are so charged with magnetism by the electrical apparatus that metals entering the chute are held in position and prevented from going into the mill.

Improvement of Coffee.

We learn from the West Indian *Agricultural News* that experiments are being undertaken by the Department of Agriculture of the Dutch East Indies, with a view to obtaining improved varieties of coffee by selection. After several years' trials, it has been found that the ordinary methods of selection which are applicable in the case of annual plants, such as that depending on the actual weight of the seed or on its specific gravity, do not give appreciable results with coffee; on the contrary, great differences were found between the descendants of different seed-trees. In the experiments the seeds of each tree were sown and cultivated separately. The growth and production of the different lots were compared among themselves, and the tree which gave the most vigorous and productive descendants was chosen to provide seed for the future.

A report on the experiments (our contemporary proceeds) states that the study of the variability of species is intimately connected with the methods of selection employed. The characters of the seed-trees have been studied in detail, and the average values of the variable characters have been calculated according to the methods of Galton and Quetelet. In many cases it has been possible to separate a large number of varieties, which have been proved constant by sowing, from the typical species; thus under *Coffea arabica* no less than fourteen such varieties have been described.

Rubber on the South Coast.

An interesting letter has been received from a correspondent at Widenham (South Coast), who is experimenting with rubber cultivation. *Inter alia*, he writes:—"I have been endeavouring since August, 1906, to establish rubber plants (*Manihot Glaziovii*). Twice I failed totally, but eventually, in 1907, by propagating in seed beds and transplanting in January, 1908, I succeeded with very few losses. There are now some 1,800 trees established and a further lot of 1,200 seedlings coming on. I should judge, given a fair chance in the shape of cultivation, keeping free from weeds for the first couple of years, these trees would grow very well here. It is too early to say anything with regard to yield. I have also planted," he adds, "a small quantity of *Manihot dichotoma* and *Manihot piauhyensis*, and have about 15 trees growing. They seem likely to do well." Our correspondent's success so far should serve to encourage others on the Coast who may be disposed to experiment. We shall at all times be glad to hear from readers who are taking up the cultivation of this interesting crop.

Citrons.

So much interest has been taken in the citrus crops of Natal recently that it is somewhat surprising that no mention has been made of the "citron." If naartjes are the pigmies of the citrus fruits, citrons may surely be called the giants, and, knowing the English markets as we do, we feel assured that if they will accept our "pigmies" they will heartily welcome our "giants." Citrons have a world-wide reputation, and in some parts their value is so great that as much as a sovereign has been given for a single fruit. The home of the citron is the shores of the Mediterranean, and perhaps the best specimens are grown in the Island of Corsica. The British Consul at Ajaccio speaks most highly of the citrons of that island, and states that the average returns from each tree may be taken as from £10 to £12 per annum. If this can be done in the Island of Corsica, where this fruit comes into competition with that of other localities, there is no reason to believe that it would yield a less sum if carefully cultivated in this Colony.

In appearance citrons are somewhat like the lemon. They usually run to a point, and on cutting them open strings may be seen on the inside of the peel which all converge to the apex. The odour of the rind is somewhat sweeter than that of the lemon, the skin is very much thicker, the fruit is much larger, and the general description may be summed up in Bonavia's words, when he says "the fruit is like a huge lemon, with tremendously thick rinds, and little substance inside," single specimens weighing as much as 6 to 7 lbs. each. The demand for this fruit is not only from oversea, but we understand that Mr. T. W. Turner, of Box 781, Durban, is already a large buyer of citrons, and would give any information to growers, either present or prospective, if they will communicate with him.

Manuring and Meat Production.

A paper on the relationship of manuring to meat production was read by Professor Somerville before the agricultural sub-section of the British Association this year. According to *Agricultural News*, it presented results of experiments which have been conducted over a period of nine years. They show that the manuring of pastures with lime does not lead to profitable increase in the amount of meat produced. When lime and superphosphate were used there was a small profit. By the use of basic slag, in the first year only, a large gain was obtained, and even at the end of nine years the effects of the manure were not exhausted. This result has been obtained in other duplicate experiments; it shows that it is better to stimulate the growth of the best plants in a mixed pasture by a large initial application of phosphate than

to apply it year after year. With superphosphate the annual profit was reduced. No monetary gain resulted from the employment of potash and phosphate. Nitrogen in the form of sulphate of ammonia increased the yield of hay, but actually reduced the annual production of meat. This result shows that the weighing of the produce of a pasture as a method of determining its value for feeding purposes is not reliable. Further trials with basic slag show that as good results were obtained from an application when the herbage is growing vigorously as from an application given several months before the growing period. It seems to be indicated by the experiments that no crops offer better opportunities for the employment of artificial manures than those on poor, worn-out pasture.

"Trout-Fishing in Natal."

We have lately received from the General Manager of Railways an illustrated pamphlet which has been compiled in his office by Mr. A. H. Tatlow, of the Publicity Section of the Department. The booklet is entitled "Trout-Fishing in Natal," and is a very creditable specimen of the printer's art. A literary and artistic production of no mean order, it sets forth the attractions which angling has for the majority of men who look for the occasional change of scene and occupation "which shall at once recruit the energies of the body and give free play to faculties and feelings which are shelved during the daily routine of working life," and proceeds to enumerate the charms of trout-fishing, for, "as most anglers know, trout have now been acclimatised in South Africa, and several rivers have been stocked for from five to ten years; the fry grow about an inch a month—at any rate in their first two years—so most of the Natal rivers are now at their best, and in all probability will continue to afford excellent sport." The various fishing districts are then described—Bushman's River, the Mooi River at Rosetta, the Mooi River at Nottingham Road, the Umgeni River near Dargle Station, etc.—and full information such as the angler and tourist require is given. Next the pamphlet goes on to offer hints on fly-fishing, and concludes with particulars as to the dates on which the various rivers were originally stocked with trout, with the rules and regulations of the Natal Anglers' Association and a useful table giving the nearest stations on the railway to the fishing districts, the names of the rivers, the fishing mileage in each case, the distance of the river from the station and from the hotel and of the hotel from the station, hotel accommodation, nature of fish, class of bait, facilities available such as rod, tackle, or other conveniences, the best season, weight of catches, whom to apply for permission to fish, and the farms through which the streams flow. It is a pamphlet, in short, which is indispensable to the trout angler in Natal.

Points of a Good Cow.

Some useful information regarding the points of a good cow of the dairy type is given in a bulletin (No. 20) issued by the Storrs Agricultural Experiment Station, U.S.A. It is pointed out, *inter alia*, that the capacity of a cow for producing milk depends largely upon her capacity for digesting food and assimilating it into her tissues. For the accommodation of a large and efficient digestive apparatus, a good dairy cow should have a long, deep and wide barrel with well-sprung ribs. This form of middle piece gives ample room for the storage of food, and for an apparatus capable of disposing of large quantities of the coarse, bulky fodder which the cow consumes. The chest, we further read, should be deep, providing room for generous-sized heart and lungs. These organs, vital in every animal, are required to do more than ordinary work in the dairy cow: the digestion of a large amount of food and its conversion into milk require an expenditure of energy and vitality equal to that spent in the performance of hard work: and consequently there should be a vigorous circulation of blood and ample provision for its purification, and for a large supply of oxygen.

Furthermore, there is need for a highly developed nerve system. The more pronounced of the outward signs that indicate this nerve development are a bright, lively, and prominent eye, this prominence causing a dished face; a wide forehead; a wide junction of the skull and spinal column, indicating a large brain; a large prominent backbone, giving room for a well-developed spinal cord; a long slim tail; and considerable energy and vigour and style of action. The milk organs are intimately concerned in the productive capacity of the cow, as it is in these that the milk and butter-fat are finally elaborated from the food. The dairy cow should have a large udder capacity, the larger the better, but the size of the udder should not be due to any large amount of fat or flesh. There should be an elasticity of the tissue, with a shrinkage of the udder when empty. The udder should have considerable surface, extending forward and well up behind. It should be well balanced and symmetrical in shape, indicating good development in all quarters; for the more perfectly developed the organ is, the larger the amount of milk it will be likely to yield. It should be spread considerably from side to side also, while the teats should be even, and squarely placed. To make room for such a capacious, well-developed udder, the hind legs of the cow should be wide apart, the thighs should be thin, and the flanks high arched.

The milk veins should be large and elastic, should extend well to the front, and should enter the abdomen through large or numerous orifices, thus permitting a strong flow of blood through them, with a minimum of

resistance as it returns to the heart. Besides these veins, there is a network of them in the four quarters of the udder, and still others pass upward behind, which, when large, indicate considerable productive capacity. Many generations of selection and breeding by man have prolonged the period of activity of these organs in the dairy cow, but the beginning is always a function of reproduction, which must occur with considerable regularity in profitable cows. In order that this may happen with the least tax upon the general vigour and activity of the cow, she should have broad hips and a high pelvic arch.

Marshall's Oil Tractor.

The *Agricultural Journal of India* gives an account of an engine for implemental tillage and other agricultural operations, manufactured by Messrs. Marshall, Sons & Co., Ltd., of Gainsborough, England, with the object of supplying a cheap mechanical power for agricultural purposes, which may possibly be useful in India. The tractor is fitted with a two-cylinder engine and has three speeds, 2, 4, and 6 miles per hour. The engine can be run on petrol, kerosene, benzine, gasoline, etc. With tanks filled with kerosene, it can be run for ten hours continuously. The engine is fitted with wide travelling wheels to travel over sandy ground. In working order, it weighs approximately $4\frac{1}{2}$ tons and carries 25 gallons of fuel and 75 gallons of water; it is fitted with a water-cooler and a patent pump for circulating water through the cylinder jacket.

The engine can be used for ploughing, harrowing, cultivating, sowing reaping, and hauling; it can also be used for driving any fixed machinery such as threshing and winnowing machines, corn and cake-grinding mills, chaff-cutters, etc., without any addition or alteration. This engine drives a full-sized Marshall's Threshing Machine fitted with a chaff fan, Bhoosa rollers and Bhoosa shifters continuously for five hours with a consumption of $1\frac{1}{2}$ gallons of kerosene per hour. One man is required to operate it. Experiments in India show that it can plough $1\frac{1}{2}$ acres of land that has been previously broken per hour, with a consumption of less than 2 gallons of "Chester Brand" kerosene oil, and uncultivated land at the rate of 1 acre per hour with the same consumption of oil. The cost is £533.

The Deputy Director of Agriculture, Bengal, saw the machine at work at Semapore and reported thus: "We were only able to test the ploughing, as there was nothing to thresh and no pumps or ordinary machinery to be worked. Soil tested by ploughing was sandy loam. Two four-furrow ploughs were attached to the back of the tractor, and eight furrows, 6 inches deep and $9\frac{1}{2}$ inches wide, were ploughed at one and the

same time. *Plough*: Cockshutt's (Canada) Four-Furrow Plough, cost £20. *Work done*: Nine acres in seven hours. *Cost of fuel per acre*: 1s. 7d. *Area ploughed per day of ten hours*: Thirteen acres. The oil tractor will not suit small holdings or paddy cultivation, but where large holding of high land cultivation are concerned, and where labour is scarce and dear, the oil tractor is an economical motive power for ploughing."

Importation of Bees, etc.

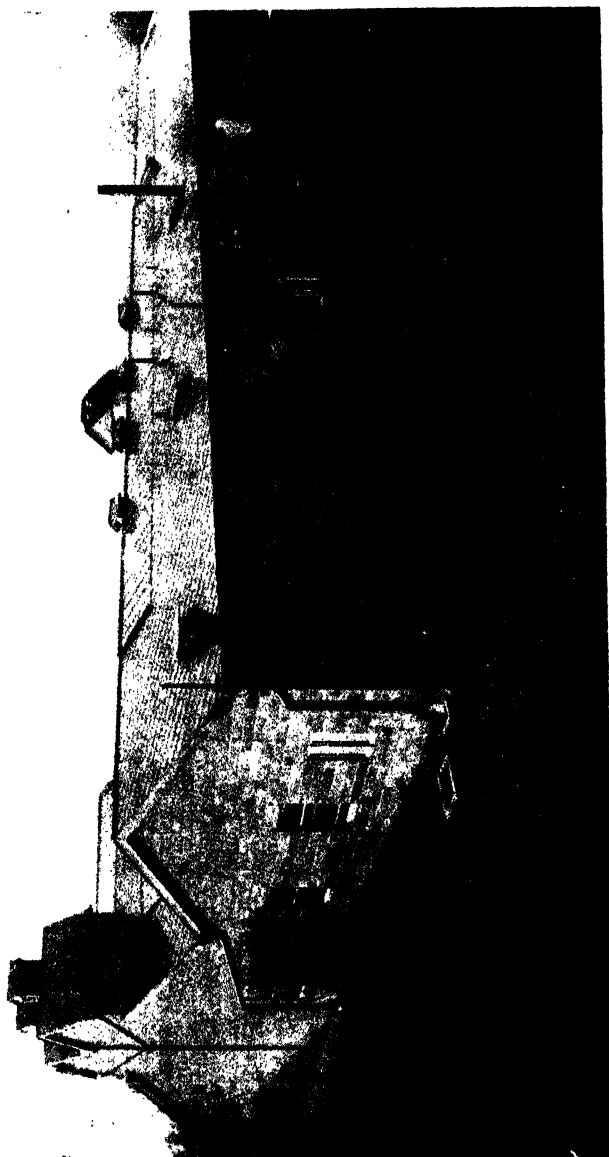
Under Section 1 of Act No. 15, 1909, the Minister of Agriculture has prescribed the following conditions in respect of all importations of bees and their larvae, honey, beeswax, foundation-comb, honeycomb, etc., from places beyond British South Africa, viz.:—(1) Application to import bees, bee-larvae, beeswax, foundation-comb, honeycomb, and honey from places beyond British South Africa shall be made in writing to the Minister of Agriculture before any order for the delivery of such is placed. Such application shall be accompanied by full particulars as to the quantity and nature of the proposed importation, the place of origin, and the person or agent from whom or through whom it is proposed to import. (2) All consignments arriving shall be detained by the postal or Customs officials pending the presentation of the permit to import, and before the consignment is handed over the importer or his agent shall produce such evidence as may be required to show that the conditions under which permission to import was granted have been fully complied with. (3) In the case of consignments by post, the postal officials of the delivering office shall, upon being satisfied that the conditions imposed have been complied with, so endorse the permit issued and forward the same to the Department of Agriculture. (4) Where consignments arrive through the port of Durban they shall be subject to detention and inspection by the Examiner of Plant Imports or other duly authorised officer of the Department of Agriculture to whom the permit shall be given up by the importer or his agent. (5) An examination fee of 2s. shall be paid to the examining officer in respect of each consignment for which an official receipt must be obtained. (6) No consignment will be passed by the Customs Department until a certificate of inspection, to which must be attached the official receipt for the examination, has been presented for inspection. (7) In the event of consignments arriving through the port of Durban for places beyond Natal, in respect of which no permit to import is presented by the local agents, the examining officer is authorised to detain same pending satisfactory evidence that a permit has been issued. (8) The importation of beeswax and foundation-comb is further subject to the production, in the case of each consignment, of sworn declarations from the place of origin in accordance with Forms A and B, set forth in the annexures to this notice.

The annexures "A" and "B" referred to are as follows:—ANNEXURE "A": *Form of Declaration required to accompany Importations of Beeswax.*—I (We) do hereby solemnly and sincerely declare that the undermentioned beeswax supplied by me (us) to of, on has been melted for not less than two and a half hours at a temperature of not less than 212 degrees Fahr., and has not subsequently been on premises, or within two miles of premises, where Bee Disease of any description is known to exist. And I (we) make this solemn declaration, conscientiously believing the same to be true. *Signature* Declared at this day of, 19.... Before me,, Justice of the Peace, or other Officer authorised to administer Oaths. Quantity of Beeswax referred to in this Declaration—ANNEXURE "B": *Form of Declaration required to accompany Importations of Foundation Comb.*—I (We) do hereby solemnly and sincerely declare that the undermentioned foundation comb supplied by me (us) to of on has been made from beeswax that has been melted for not less than two and a half hours at a temperature of not less than 212 degrees Fahr., and has not subsequently been on premises, or within two miles of premises, where Bee Disease of any description is known to exist. And I (we) make this solemn declaration, conscientiously believing the same to be true. *Signature* Declared at this day of, 19.... Before me,, Justice of the Peace, or other Officer authorised to administer Oaths. Quantity of Foundation Comb referred to in this Declaration

Some cows will not pay a profit under any system of feeding. Cull these from your herds and send them to the market.

The degree of freshness of an unincubated egg can, to a limited extent, be tested by the size of the air vesicle, the latter in a very stale egg, or in one ready for hatching, occupying from one-sixth to one-fifth of the space.—J. H. SUTCLIFFE (*Artificial Incubation and its Laws*).

A great many people think it is too expensive to hold over the matured sows for one litter a year.



THE DUNMOW FLITCH BACON FACTORY.—I.
General View of the Buildings.
(See Article.)

The Living Bee.

By MARY RITCHIE,

*President, Natal Bee-Keepers' Association, Natal Expert, South
African Bee-Keepers' Association.*

Continued from Page 730, Vol. XIII.

IX.—SPRING MANAGEMENT.

It is a Kafir saying that when the thorn trees are green the spring is near. The bees anticipate an early summer and drone-rearing is begun. This and the appearance of snow-white flaxes of wax on the under side of the covers and along the tops of the combs are the signs of spring as certain as the sprouting of the new grass and the coming of the lilies.

There are no hard and fast rules to guide the operations of the bee-keeper, but the motto "be ready" is one to remember in view of the honey harvest. As soon as the weather is warm, each colony should be transferred to a clean hive, or where this is impossible, given a fresh, clean bottom board. All spare hives should be cleaned and re-painted in readiness before the hot weather, and the roof seen to be thoroughly weather-proof before the rains. A sheet of mathoid makes a very good shade board, being lighter and more pliable than zinc, and if well painted is more enduring than thatch.

The great secret is to know your locality and have your bees ready for the honey-flow. This of setting each hive on a clean bottom board is just as necessary in South Africa as in colder climates, as cleanliness is of the first importance. (It is noticeable, for instance, that a queen will always lay in new comb in preference to old.) The moving in itself rouses the bees from their winter lethargy, and an Alexander feeder placed below the hive and some warm syrup poured in every night for a week will gladden them exceedingly. A good feed of pea-flour—scattered in a deep box some distance from the hive—is an advantage. It secures a frame of pollen at the side of the brood nest, which will induce the storing of more pollen at the same place, and so keep it out of the sections.

As soon as the wax of the comb is whitening along the top a super should be put on each hive. The usual plan has been to wait until the ten brood frames were fully drawn out, but over a strong colony such as a newly-hived swarm Mr. Danzenbaker recommends putting on the super at once on the morning of a warm day.

The next task is to get the bees into the super, and shallow frames are invaluable for this. By putting on shallow frames (which the bees

prefer to sections) the bees are enticed upstairs. When fairly at work *and honey coming in*, the eight centre frames are quickly removed and sections racks put in their place. The two remaining outer frames serve to keep up the cluster. This plan ensures that the sections are only on the hives when the bees are booming strong, for the quicker sections are filled and taken off the prettier they will be. The bees must be strong in the super, but on no account do we want the queen. Here I should like to warn beginners against smoking too hard at the entrance, which is very apt to send her majesty upstairs. A little smoke at the entrance to disarm the sentinels and more when gently raising the lid. Another cause of the queen sometimes entering the supers is said to be small starters; these the bees finish as drone comb, which proves inviting to the queen. Sections should be damped at the joints before putting up. A large top and small bottom starter about the tenth of an inch gives the best results—sections not only beautiful to look at but capable of travelling long distances by rail without breakage. For putting in foundation the old-fashioned block method is still as easy as any. A row of blocks half the thickness and exactly the inside size of a section are screwed on a board. The hot wax is dropped from a pointed spoon and made to run round. The new lamp device and thin metal plate kept at the right temperature works perfectly.

BAIT SECTIONS.

To put on supers without bait sections is like fishing without bait. These are half-finished sections from the year before if possible, but even a piece of old black honeycomb cut out of the brood nest is better than none.

X.—INCOME AND EXPENDITURE.

A spell of wet weather and the bees like ourselves are confined indoors. Have they been quarrelling or what: there are many dead drones around the hives? Not necessarily; though this is the direct result of the wet weather, it does not mean that the bees have been quarrelsome. On very hot days their tempers are short, but as a rule they are the most peaceful of citizens.

Wet weather means a lull in the honey-flow. The heavy rain washes the honey out of the blossoms, and even though they venture out between showers there is none to be gathered. Finding their income reduced the bees immediately reduce their expenditure, first by killing useless drones, but if this is not sufficient they will sacrifice the worker larvae and pull the little unborn babies out of their cells and throw them away, because they cannot afford them; and if times are very bad and her own food supply curtailed the queen will stop laying altogether until honey prospects brighten.

Now, if there is fine weather and an abundant harvest the drones are not turned out, the queen lays her two thousand eggs a day—a very marvel of maternity—and the sisters prove the most affectionate and devoted of nurses. When stores are abundant and the weather is mild, as in some parts of Natal, the drones are kept the whole year round. As soon as cold weather sets in the burly fellows are excluded. “How cruel” people say of the worker bees. “How brave” when we understand how necessity has forced their hand. “How kind” when we consider how they have fed and pampered them throughout the summer.

The drones go first as they are easiest spared, but they will not fail to sacrifice themselves should the need arise. American bee-keepers tell how on receiving Italian queens by rail the attendant bees are often dead. She alone is alive in her prison. The faithful little subjects have denied themselves food and actually starved to death in order that the queen might live.

XI.—THE ODOURS OF THE HIVE.

Another approach to the bees is by the scents of the hive, but just as there are many sounds which our ears are too blunt to hear so there are innumerable scents which lie beyond our ken.

Gleanings in Bee-Culture for February, 1908, contains a translation of a valuable contribution by a German scientist, H. v. Buttel-Reepen, Ph.D., to the natural history of the honey bee. Bees, he says, recognise their hives by means of the hive odour. The following odours are present in a colony of bees:—

- (1) The individual odour, queen odour, worker odour, and drone odour all offspring of one mother having a common family odour.
- (2) The wax odour. The wax structures of different colonies being the work of different generators have different odours.
- (3) The honey odour.

All these different odours compose the hive odour. Thus single bees besides their individual odour possess the family or hive odour. If a swarm is made of the bees hanging in front of several hives which in strong colonies often make great clusters (beards) by scooping them up in a ladle, there will probably be bees from ten, twenty or thirty different hives.

If they are put into a hive and given a queen, with the observance of proper precautions, these bees, from, let us say, thirty different hives, form a peaceful colony in a few hours, which adjusts itself in its new dwelling and takes up the ordinary tasks of the day. Here we have thirty family odours united into a special hive odour, peculiar to this colony alone, merely by the scooping together.

The proof of this can be found in the fact that a queen placed in such a colony can be set free after twenty-four hours. She has taken up the hive odour. The hive odour then is not inherited, but is formed by the union and mixing of individual odours of brood cells. The chemical processes going on at this time in the cells for the development of the larvæ are of so intense a nature that a very high temperature is maintained in the brood chamber.

On spring days the exhalation of the brood, which smells like fresh baked bread, may be perceived some distance away, in the direction of the wind. Very likely the queen odour and the humming of the queen-right colony are of first importance. At the same time the attachment of the bees to the brood is very strong, as may be seen from the fact that an unruly swarm which has already withdrawn from one unaccepted hive will sometimes remain if given a frame of brood.

The whole subject is worth further study. A Zululand bee-keeper notes that bees are susceptible to human odour much the same as game. He has noticed in connection with wild colonies that bees coming up wind would suddenly bear off, but those coming down would continue their flight to the entrance

XII.—THE SOUNDS OF THE HIVE.

In practical bee-keeping there is nothing the beginner will find of greater service than to learn to interpret the various sounds of the bees. To distinguish all would require a sense of hearing keener than that possessed of human ears, but even the dumbest ear, after long listening, becomes familiar with many bee-notes, and finds meaning in what to the novice is nothing but a bewildering confusion of sound. We must learn to interpret these various sounds from the everyday happy hum of the bees in the flowers, varying as it does in intensity and eagerness, but expressive always of satisfaction and delight, to the strange "peep-peep" of a princess in her, as yet, unopened cell.

When the weather is warm and honey plentiful each bee leaves the hive with a flourish. "Whizz, I am off" sort of exclamation, or is it a hymn of gratitude for a new day and sunshine?

The noon-day spell is a living song of gladness—an ariel dance, in which the young bees join and learn the joys of flight; a thorough ventilation and refreshment of the hive, but often a source of consternation and alarm to the beginner in bee-keeping, for he is sure that in all this uproar his bees are swarming or robbing or doing something dreadful, until he discovers it is only play, and that each hive repeats this performance at the same time every day. To the uninitiated the noise is suggestive of swarming, and he watches with some concern until the bees have gone back and the usual quiet is restored.

One of the most interesting sounds is the "call of the queen" or the "call of the home," the sound that when a swarm is being lived leads them up to the entrance in such unerring lines.

All these are sounds that one is glad to hear, but there are unpleasant sounds as well—the sound of the robber, the high, angry note of an enraged bee, the bee that has a grudge against you and is determined instantly to pay it off. A bee "calls out" when it is being captured or hurt, and a queen when she is frightened. Bees annoyed by ants call in distress and spit at their tiny tormentors, like defiant kittens. The wail of a queenless colony is easily known and utterly sad, though most pathetic and pitiful of all is the sound of bees that have lost themselves in the rain or darkness.

We have spectacles and microscopes to aid our eyes, but what of an instrument that would enable our ears to distinguish the delicate sounds of the hive we are at present too deaf to hear!

XIII.—BEE-BREAD OR POLLEN.

It is interesting to watch the bees sipping honey, it is still more interesting to see them load up with pollen. How does a young bee that has never gathered pollen before know just where to find it. She does not fly direct to the tree as an older bee would do, but with evident doubt and uncertainty. Instinctively seeking honey and guided perhaps by the colour and the scent of the blossoms, she hums "It is here somewhere, somewhere I know just here"; but the game is new and she has yet to learn where Dame Nature usually hides the slipper. Watch the plants near a hive. While older bees are flying far afield, the young bees are in the weeds at your feet. One weed (*Richardsonia pilosa*) is a special favourite. It is a prostrate plant with many stems branching all over the ground with flat green leaves, very hairy, and dense heads of little white flowers.

The blossom found, she quickly dips her tongue in the honey cup and deftly lifts up the pollen. To the sticky surface the pollen grains adhere but are almost simultaneously brushed off with the hairy knee-joint of her first pair of legs, and with the second pair she quickly pockets the pollen, the same amounts on either side, like John Gilpin, to keep her balance true. She often gathers honey without pollen but never pollen without honey. For one reason her honey pockets have no flaps to them, and unless the pollen grains are sticky they would tumble out. Another load and off she flies happy to the hive. Important because of use, she hurries in, deposits her load in front of a cell, and leaves the younger bees to pack it in.

The pollen of some coniferous trees is so exceedingly fine (the word *pollen* means fine flour), that to shake the plant is to envelope it as in a

mist. But the pollen grains the bees gather are by no means so microscopic. Beginners invariably find great pleasure in watching at the hive entrances for the laden bees and guessing the source of the pollen from the colour of the pellets. Yellow, of course, is the commonest colour, but they bring green pellets and pink pellets and pellets of lilac hue, dull gold at the time of lilies, and snow-white when the bush is blue with ipomea or convolvulus. Look at the pollen of the wall-flower, the orange-blossom, the petunia flowers and the mignonette, being careful not to get stung as the bees are certain to have found it before you. Nor is it needful for you to taste it unless, of course, you are fond of sulphur!

Few flowers have a greater quantity of both pollen and honey than the aloes. The Kafirs know this as well as the bees and suck the blossoms eagerly for the nectar, while the aloe not only provides the honey but bestows on each sticky brown face a liberal moustache of yellow pollen!

"We don't want any pollen" says the beginner, we just want *honey*. You may not, but pollen is an absolute necessity for the welfare of the hive. It has been proved to be indispensable as food to sustain the strength of the bees during their work in comb-building. The more food there is the more is given to the queen and the more her egg-laying increases, while young grubs, unless supplied with pollen, will die within twenty-four hours.

In England and some parts of America bee-keepers feed meal in the spring as a substitute for pollen, mixing it with sawdust on the ground, perhaps white with snow. But such artificial pollen or bee-bread is only needed as a starter in most localities in this country.

XIV.—SWARMING.

"Everything must go in the wagon," so everything was put in the *ex-wagon*. We already filled it comfortably, but when provision boxes, rugs, personal properties, books, coats for the return journey, etc., etc., were piled in from every side, there was scarcely an inch of space to spare.

A pause occurred just after starting—not one but several—this last, the appearance of the post-boy sauntering up from the station—called another halt and we waited in the heat, the sun rising higher and higher every minute. The outer row kicked their heels with impatience, the inner being somewhat uncertain in the labyrinth, as which were their own heels and which their neighbours', came to the limit of their endurance, and exclaimed "let's swarm."

Such is the condition of a hive at swarming time. The brood cells are packed with larva of all ages, honey has been coming in and fills every vacant cell, big burly drones jostle the workers in the narrow path between the frames, the days become hotter and hotter, more and more brood hatches out, resulting in a state of overcrowding that if not brought

to the attention of the authorities—otherwise the bee-keeper—compels the bees to exclaim “let’s swarm.”

With this intent queen cells are begun. These are like little acorn cups at first, and in each the queen places an egg similar to that laid in a worker cell. (Should she not see fit to do so, the bees will remove eggs from the worker cells and place them in the queen cups or relinquish their intention of swarming altogether, in which case the cups remain and are not drawn out into queen cells.) The egg hatches and a tiny larva similar to thousands of others in the hive hatches out. But a different fate awaits it. From its earliest infancy it is petted and pampered, its home is roomier, its food is richer than that of the others. Everything in Nature is more or less influenced by its environment, but surely nothing more so than the little larva chosen for the queen cell—for fed on “royal jelly” it becomes a perfect female, a princess first, and finally a queen.

Queen cells are easily recognised. They are usually built on the edges of the comb or perhaps in groups of twos and threes, sometimes along the bottom and sometimes on the face of the comb, in fact, wherever there is room for them. The cells when complete resemble so many thimbles hanging downwards from the comb.

The building of queen cells is a certain preparation for swarming, and as soon as the queen cell is capped over, the old queen and the majority of the bees make ready to depart. But first of all a new home must be secured, and a party of five or six, or parties it may be, go out house-hunting. These house-hunting bees can scarcely be mistaken, they are very plainly seen to be looking for something—very anxious and important they look—the whole colony depending upon them to secure it a suitable habitation.

The eventful morning arrives—a warm still day. The bees load up with honey and all are ready for the start. How quiet the bees look from the outside, but life is at high pressure within. It is the greatest event in the history of the hive. The swarm issues, the bees pour out in one continuous stream, as though one will compelled the thousands of quivering wings. For a few minutes the air is alive with bees, and if the bee-keeper means to hive the swarm he must hustle round, as Mr. Root says, faster than if the house was on fire. The old queen goes off with the swarm and the young one reigns in her stead. A few hundred nurse bees are left, but the majority are off—off to find a new home and build a new city from its very foundations.

Perhaps the next day—the 12th or 13th, at any rate from the laying of the egg her royal highness emerges from her cell. While still captive she utters a shrill “peep peep” quite audible above the hum of the bees, and interpreted as a challenge to the other princesses in the royal cells close by. For, she will make it her first task to destroy them as no two queens of the same age can reign together in one hive. If the

bees are numerous they may protect these other cells and so form successive swarms, or the bee-keeper may save them by removing them on the 10th day along with a number of the bees to form new colonies or nuclei.

AN OLD WORLD CURE FOR CATCHING A SWARM.

"Take some earth, throw it with thy right hand under thy right foot, and say "I am trying what earth avails for everything in the world against spite and against malice, and against the mickle tongue of man (not woman note you!) and against displeasure." Or throw the gravel over the bees and say "Sit ye, my ladies. Sink, sink ye to earth down. Never be so wild as to the woods to fly."

A MORE MODERN METHOD.

To prevent swarming, or rather to accomplish this at a time when convenient to the bee-keeper, the Americans practise what is known as shook-swarming. In view of this the hives are built up in the fall to two stories, with an excluder zinc between. The upper hive has all the honey the bees possess, and the lower all the brood.

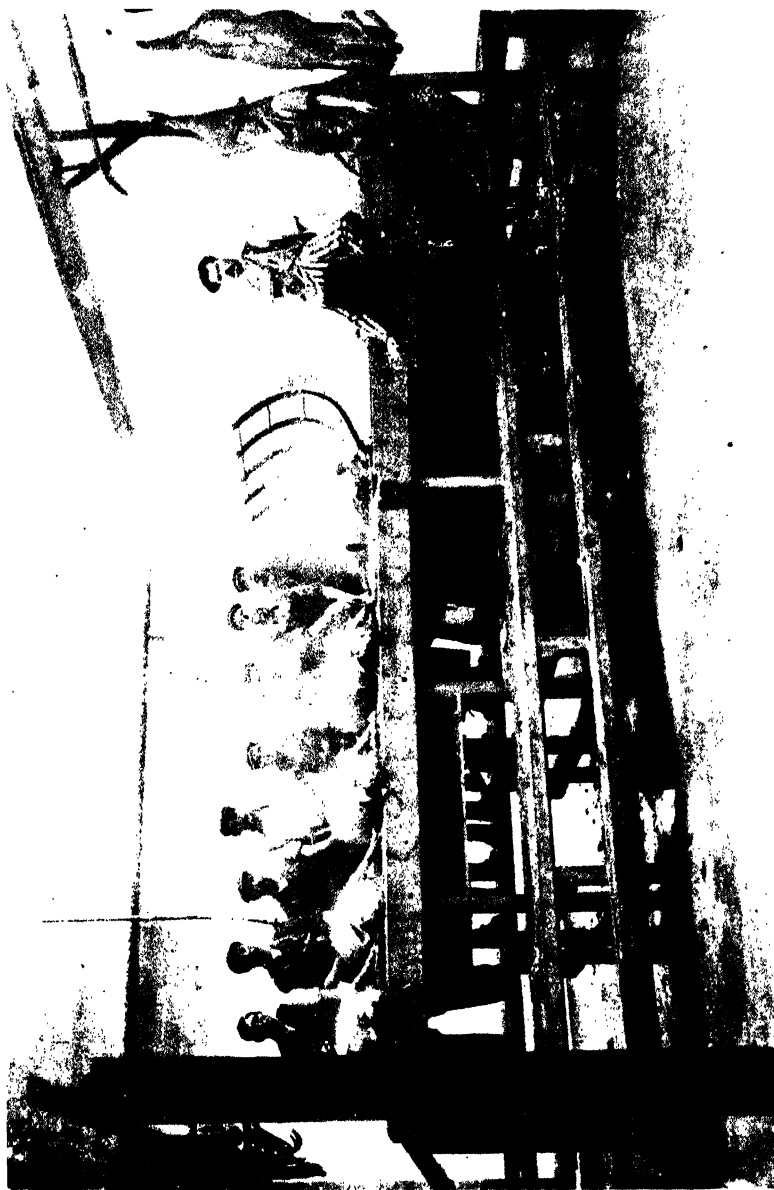
In swarming naturally the bees seek escape from the multitude of babies, and this is secured by shook-swarming. In this artificial swarming the lower hive is removed and the upper hive put in its place, with a frame of unsealed brood in the centre of the honey frames. The frames of the lower hive are gently shaken one after another in front of the entrance and a super of sections containing bait sections or extractor frames placed on top.

The bees are in right condition now to take advantage of the honey flow, and with the assurance of plenty set about drawing out the foundation in the sections, marvellously white because of the clean combs below.

The hive-body with beeless brood is set on one of the weaker hives above a queen excluder, and later when the brood has hatched and some honey in the frames the same operation is gone through till all the hives are strong.

In South Africa bees swarm both in the spring and in the autumn, and if there is a good honey flow and the hive is small in the summer as well. One can understand them swarming in the spring when the fine weather comes and everything is full of effort and adventure, but when the wind blows over snow it seems strange that they should relinquish their comfortable home with its abundant stores and set out and begin all over again. And yet only the other day I heard some one exclaim, "What a glorious day: just the weather to trek." "Just the weather to swarm" echo the bees, and, leaving the young nurse bees to attend to the babies, off they go.

Most natural swarms one hears of are in the autumn. These may be starved out colonies, as times of scarcity will cause swarming as well as times of plenty, or they may be colonies rendered homeless by grass fires.



THE DUNMOW FLITCH BACON FACTORY.--II.

After the pigs have been slaughtered and scalded, they are tilted by means of a mechanical tilting table on to the scuttling table, where they are scraped free from hair.

(See Article.)

At noon on Wednesday the swarm we hived on Sunday came out again. Out we rushed to find them all in the air and fast making for the wattle woods. But something seemed amiss, and they flew backwards and forwards in great perplexity. It was evident they had lost their queen. The hive was a scene of still greater excitement. We had fastened an alley trap across the entrance. As we stooped down to watch, they came pouring back, hurrying into the hive as fast as they had left it, and this to our great delight as we felt that this time, at least, we were masters of the situation!

There is something catching in the feverish excitement of a swarm. It is counted as a misfortune should be chance to miss it. A delightful description of swarming bees is that by Le Quex in the opening chapters of his story, "The Blue Pavilions." Their behaviour is spirited and loses nothing in the telling. By swarming, especially in awkward places, the bees attract the attention of people who have paid not the slightest heed to them during the year. Unfortunately the attention is not always kindly. They are voted a nuisance and thoughtlessly often cruelly destroyed, and sometimes—but this we hope is rare—tortured to death on fly-papers.

I am sure that every bee-keeper who is worthy of the name will seize every opportunity the swarming season offers, to lighten the ignorance that still exists in Darkest Africa with regard to the value of the honey-bee.

The swarm obtained, the usual procedure has been to proceed to cut the queen's wing so that she may be easily recaptured when issuing with a swarm. This practice has been going out of fashion within recent years.

XV.—CLIPPING QUEENS' WINGS.

My first attempt was a failure—utter and complete. To begin with, there were more moths than bees in the hive which I bought. After some wonderful attempts I caught one bee which appeared to be the queen—at least there were thirteen other bees round her—her escort obviously, it said so in the bee-books. Then the expected happened. I was well read in the subject and knew that queen bees though they do not sting will sometimes pinch severely. That bee pinched me—so severely that I let it go. There was no brood in the hive I remember, and I have since come to the conclusion that neither was there any queen. But I have never since been bitten by a drone.

The next memory is that of a blazing hot wind—a hot wind that scorched the leaves of the cherry trees and drove a swarm that had left two days before to seek the shade of the house and alight on a yucca plant within sight of the window. To open the door was like opening the gate

of a furnace—to look outside was to feel faint. But everything must be braved to secure the bees. After some trouble and many pricks from the yucca leaves, the bees were hived and carried to the bee-house. Here I proceeded to find the queen and cut her wings. A mosquito net hung from the ceiling made an excellent bee-tent. It was hot outside, hotter in the bee-house, but hottest of all in the bee-tent with an assistant and a beesmoker. The chase that ensued was even hotter still.

"Queens," said the bee-books, walk quickly across the combs. This one didn't—not once. She flew over the hive, under the hive, out of the hive, into the hive. It was simply marvellous. I could not keep up with her. When she was there, I was somewhere else, when I was ready—she had gone. At last I caught her and let her go again. The man with the hedge shears was not more clumsy. The bees grew more and more excited. They were everywhere but the queen nowhere. Finally the dinner bell rung. The assistant was hungry—so was I. With a last desperate effort I cornered her, cut her wings, and, feeling decidedly clever, set the hive on its stand. Dinner was waiting. So much I knew at the time, from later experience I am quite sure that queen was balled before we came to the pudding!

The next queen was carried indoors under a tumbler and the whole household summoned to see the deed done—professionally done with a pair of fine embroidery scissors. She was safely given back to the bees. After that I practised catching bees and drones by the wings without harming them till the nervousness was overcome. Later I adopted the Alley trap—a serviceable but not infallible device. For the past two seasons I have practised shook-swarming as advocated by Mr. Doolittle, and am eagerly awaiting his new book on this subject. I am grateful for his teachings: so I venture to think are my queen-bees!

A TEST FOR MILK.—A simple and effective test to determine whether water is present in milk may be made with an ordinary knitting-needle, if the needle is bright and well polished. Dip the needle into the milk and quickly withdraw it in an upright position. If the milk contains only a small quantity of water this will prevent even a drop of milk adhering to the needle. Everyone who has occasion to heat milk knows how easily it may be scorched. When this does happen, the thing to do is to quickly remove the vessel from the fire and stand it in a bowl of cold water. Put a pinch of salt into the milk and stir. It will then be found that the disagreeable burnt taste has almost, if not entirely disappeared.—*New Zealand Dairyman.*

Bacon-Curing in Essex.

THE DUNMOW FLITCH FACTORY.

By LOUDON M. DOUGLAS, Edinburgh.

So far back as the twelfth century bacon-curing was known in Essex, as has been shown in an account of the story of the Dunmow Flitch which has been published.* It would appear that the custom of presenting a flitch of bacon to married folk who could swear that for a year and a day they had neither had differences nor wished themselves unwed was instituted in Dunmow in 1111. This custom has existed until the present day, although the occasions upon which such presentations have been made have not occurred with any kind of regularity.

The interesting part of it is that at such an early date bacon-curing was known in the county, and thus Essex bacon may be considered to have an older origin than that of Wiltshire. We know that in the latter county bacon-curing has been an industry for several hundreds of years, and it is recorded by Edward Lisle** that at the time he wrote (1693-4) Wiltshire and Hampshire bacon were then well known.

The salting of meat has been known since the earliest times, and more especially was it a necessity to the early English rural population, who rarely ever tasted fresh beef at all, and who lived to a large extent on fresh pigs' flesh in summer and salted pigs' flesh during the winter. There is no doubt that in this way bacon-curing became established, as the crude methods in vogue in early times must have resulted in the production of very coarse salty products which would not appeal to modern palates.

Bacon-curing is simply a refinement of the ancient process of salting, and even up to the middle of last century was comparatively an unknown industry. It then, however, began to get organised, and it was seen that there was a possibility of the application of certain mechanical principles to bacon-curing which would result in higher profits being derived from the industry in an organised condition. Bacon factories some fifty years ago were very different from what they are now, and modern developments have been very rapid during that period, until at the present day a bacon factory is so designed, constructed, and equipped as to form a splendid building in itself, with hygienic arrangements and complete machinery which enable the main

* "The Strange Story of the Dunmow Flitch." (D. Carter, Dunmow, 1s. 6d.)

** "Observations in Husbandry," by Edward Lisle, 1705.

products to be turned out in the best conditions and also permit of the utilisation of all the by-products.

The bacon factory which has been recently constructed for the Dunmow Flich Bacon Company, Limited, has had the advantage of being founded upon the best traditions in connection with the industry, and it is surprising, considering that Essex and the adjoining counties form one of the best pig-breeding districts in England, no bacon factory on modern lines should have been called into existence until lately.

The present factory owes its origin very largely to Mr. William Hasler, of "The Croft," Dunmow, who is associated with agriculture in its various branches and who has thus been closely brought into contact with pig-breeding, not only in the county of Essex, but in those counties adjoining. Mr. Hasler has had as his colleagues, from the first inception of the business, Mr. William Dannatt, of Great Waltham; Mr. J. B. Frankham, J.P., C.C., of Little Canfield Hall; and Mr. Joseph Smith, J.P., C.C., of Woolpits, Great Saling, all in the county of Essex; and under the direction of these gentlemen the Dunmow Flich Bacon Company, Limited, have erected and equipped the factory which is now in existence and which adjoins Dunmow Station.

Before proceeding to arrange about the construction of the factory the directors made a tour through various parts of the United Kingdom in order to see for themselves how other people conducted the bacon factory business, and on their return they decided to float a joint stock company with a capital of £25,000 and to provide a factory with a capacity of from 500 to 700 pigs per week. They acquired a field adjacent to the railway station, and called in the assistance of Messrs. William Douglas & Sons, Limited, Bacon Factory Engineers, Putney, London, who are well known throughout the world as being specialists in bacon-curing requirements. It was decided to erect the factory there, and the engineers prepared plans and specifications, and it was decided that the building should be constructed of hollow concrete blocks in place of either brick or stone, and now that the building is completed the wisdom of this course is amply justified, as this kind of building undoubtedly lends itself well to the purpose of a bacon factory.

The factory is of a rectangular shape, and, roughly speaking, is about 162 feet long by about 100 feet wide. The main entrance faces the east, and the various departments are:—Pig sties (where there is accommodation for about 250 pigs), catching pen, bleeding passage, scuttling table, pig singer, and cold bath, all of which items go to make up the fittings of the abattoir of the factory. There is also an offal cellar, capable of chilling and curing 500 to 700 pigs per week. The house, where the intestinal products are dealt with, a large hanging house with a hanging capacity of 300 pigs, a chill room and curing auxiliary departments consist of a lard room, sausage room, and engine

and boiler house. There is also a packing room which connects up between the various departments mentioned and the main entrance, alongside of which are smoke stoves, drying room, salt store, and general offices.

A description of the operations which take place in the factory will serve to show to what purposes all these various departments are put.

The pigs are first of all rested in the pig sties, and, generally in the morning, are slaughtered in the abattoir, an operation which is expeditiously carried out, the blood being received in a large tank in the bleeding passage. The carcase is then thrown on to the dumping table and the leg chain, which has been used to hoist the pig, is removed, after which it is rolled into the scalding tank, the water in which is kept at a temperature of from 140 to 180 degs. Fahr., according to the size of pig to be dealt with. From this scalding tank the carcase is then thrown on to the dumping table and the hair is removed by bell scrapers: the hair forms one of the by-products which is utilised afterwards. For the manufacture of Essex bacon, which will be the main product of the factory, the carcase is then slung head upwards under the singeing furnace and is raised through the fire of the furnace and burnt, being kept in the fire for about a quarter of a minute; it is then lowered, and presents a black, shrivelled appearance, and is at once thrown into a cold water bath so as to cool down. From this bath the carcase is raised by means of the sinews of the hind feet, through which a spreader or gambrel has been fixed, and it is then suspended from the track bars and is scraped and washed quite clean. The carcase is cut open and all the intestinal and other offal, such as the heart, liver, etc., are removed. The kidney fat, however, and the kidney are left in. The carcase is then eviscerated and spread open, so as to cool as quickly as possible, and it is weighed immediately, the weight recorded being known as the "dead weight." The offal referred to is known as the "primary" offal, and is taken away to the gut house, where it is cleansed and separated out for various uses.

When the day's killing is over and the carcasses have all been weighed and have hung on the track bars for some little time they are then dismembered, the flake lard and kidney are removed, and the head and feet are cut off. The back-bone is cut out entirely and the pork steaks or under-cut of the loin are removed. All these items go to form what is known as the "secondary" offal, and a considerable amount of the value of the pig rests with these particular products, the head and feet being cured and the lard being melted down into rendered lard. The sides, which are now in the shape of a "flitch" of bacon, are immediately hung in the chill room, where they are gradually cooled down by means of a current of cold dry air at a temperature approximating 40 degs. Fahr., and this operation generally occupies about one day; from the

chill room the sides are taken into the commodious cellar and the curing process is commenced.

As soon as the bacon is cured it is turned in the cellar and allowed to drain, after which it is taken out and can be sold as green bacon, but it may also be smoked in the smoke stoves, where it may be hung for about three days in an atmosphere highly charged with the smoke derived from oak sawdust and which is maintained at a temperature of about 90 degs. Fahr. At the end of this time the bacon will present a nice brown appearance, and its manufacture is then complete as smoked Essex bacon.

It may also be prepared as pale dried bacon, and for this purpose a large drying room is brought into use, this department being kept at a temperature of about 90 to 100 degs. Fahr., so that the wet surface of the meat is gradually dried, and when this process, which occupies about three days, is complete the bacon is then available as pale dried Essex bacon.

These are the main products of the bacon factory, but hams will also form a leading feature, and special arrangements are made for the handling of these, as also for the curing of the sides which are left after the hams are cut off. It is proposed also to make rolled bacon from these sides so as to provide the varieties of meats generally produced in a modern factory.

The various types of bacon products may be classified as follows:—Smoked sides, green sides, backs, gammons, fores, and hams. The auxiliary products consist of lard, sausages, pigs' heads, and pigs' feet. In addition to these, however, provision has been made for the manufacture of cooked foods in glass moulds, such as tongues, brawns, etc. All of these, combined with the main products of the factory, form a considerable list.

It may be said that the machinery in the factory is of the very best design. The main motive power is derived from two large horizontal Tangye gas engines, which are actuated by suction gas. The main part of the machinery is a No. 7A Douglas horizontal refrigerating machine on the sulphurous anhydride principle, and which is a duplicate of many of the same type which the makers have installed in different bacon factories. In order to provide steam for the scalding, there is a small steam boiler, and this also provides the means of cooking the various products in the sausage and lard room, where steam heat is so essential.

The by-products of various kinds will be very carefully looked after, and even the bones will be steamed, so as to procure the last residue of fat.

On the whole it may be stated that the factory is a very complete one, and has been designed by the engineers from the experience they have gained in many parts of the world in constructing similar fac-

ories. The Dunmow Flitch Bacon Factory may, therefore, be looked upon as the latest complete factory in Europe, and, while the dimensions are not very large, the equipment and design can hardly be bettered.

The water-pumping arrangements, electric light, and drainage are all provided for, and it is contemplated that a railway siding, joining on to the main line which is alongside, will shortly be added.

In the earlier times of the curing of Essex bacon the Dunmow Flitch was associated with the Priory of Dunmow. It is for this reason that the promoters of the factory have adopted the name of the "Priory Brand," and there is little doubt that this name will come to be known as being associated with the finest pig products obtainable in the United Kingdom.

The factory has been fortunate in securing for a manager Mr. H. H. Whitaker, who with the staff of cellarmen and others is well able to sustain a high reputation for the various products which will be regularly produced.

REPRODUCED FROM THE PUBLICATIONS OF THE ROYAL SOCIETY

There is a great difference in the vigour and sturdiness of pigs produced by different sows. It is a matter of common experience that some pigs put on flesh more cheaply than others. Many hold the opinion that the short, chunky pig is the best grower, while the result of some few experiments would indicate the contrary. At present no one probably is in a position to state definitely just what conformation of pig puts on fat most cheaply. It may be a matter of inheritance or the individual quite as much as type.

Every country has been officially invited by the Belgian Government to send delegates to the International Congress of Agricultural Associations, which will take place at Brussels in September, 1910. In most countries propagandist committees have been formed in connection with this Congress. In default of an official committee, any agricultural society or any private individual may take the initiative in the formation of a committee in his country. The work of these committees is to make the Congress known and to procure writers of papers and adherents. The latest date for the formation of committees has been postponed to the 1st May, 1910. For all particulars as to the formation of these committees application should be made to Mr. Vandervaeren, 220, chaussée d'Alsemberg, Brussels.

Two Fodder Plants of Recent Introduction.

By W. E. MARRIOTT, Cert. R.H.S.

PASPALUM VIRGATUM.

THOUGH this grass has not as yet been fully tried here in Natal, its reputation in Australia is such as to make it worthy of a fair trial here. It is closely allied to *P. dilatatum*, but in growth it is a decided improvement on the latter. It carries more leaf, and grows more erect, and thus is an ideal hay crop.

For poor, dry soil it is considered superior to *Phalaris commutata*, or Toowoomba grass. Experiments carried on in the Pietermaritzburg Botanic Gardens have amply illustrated how well it grows on poor soil and without water. Seeds of it and *Phalaris commutata* were sown at the same time, at end of August last. After the plants were transplanted from nursery beds no water was given. Despite the drought and hot winds since experienced, the *P. virgatum* has never stopped growing, and it is now very far ahead of the *Phalaris*, which seems to take much longer to establish itself.

Its usefulness in winter has yet to be proved, but in the meantime as a hay crop, or for ensilage, it can certainly be recommended.

*** THE "CHOU MOELLIER."**

This plant is allied to the kales, and is a cultivated variety of *Brassica oleracea*; it originally came from Vendee, in France. It is spoken of as being valuable both as a summer and winter fodder plant. It grows to the height of about 5 feet, and is resistant to frost and drought. The leaves may be cut from the plants several times during the season. It should be very useful to the dairy farmer who wants green food in the winter.

Farmers and others interested are invited to inspect these fodder plants for themselves, both of which are being grown in the Botanic Gardens, Pietermaritzburg.

A mixture of gunpowder and lard is a good remedy for scratches and grease-heel; but keeping the stables and the horses' legs clean is better and costs less.



THE DUNMOW FLITCH BAGON FACTORY.—III.

Interior view of the Hanging House showing the general arrangement of track bars for carrying the sides of pigs and general offal. This department is well ventilated so that the cooling of the various products may take place rapidly. (*See Article.*)



The Safest Manure.

By ARTHUR DIXON, F.G.S.

IT is well known that the necessities of plant life are nitrogen, phosphoric acid, and potash. All these three elements are required for plant growth, and the lack of any one of them prevents crops profitably using the others.

So crude and raw fertilising material may be broadly classed as nitrogenous, phosphates or potassic, according as nitrogen, phosphoric acid or potash may respectively be their predominating or only manurial constituent.

All natural fertilisers are not of the same value; high grade nitrate of soda, sulphate of ammonia, others at so low a grade that naturally alone they are of no value. It is therefore advisable that every farmer who does not know how to reproduce the loss his land has sustained cannot do better than put on a complete manure containing all the three essential constituents already mentioned as being required by plants. These complete compounds are highly beneficial, and when they are helped on by the ground being well limed and cultivated plants cannot but be helped by three elements of fertility being added to the ground.

Under the legal enactments now in force manure merchants have to furnish guarantees of composition with manufactured fertilisers. So every farmer should hold a value of the manure received, as he cannot determine from its appearance. The law ought to go a step farther and insist on a guarantee of the sources from which they were obtained.

USEFUL HINTS REGARDING CROPS.

Wheat thrives best in clay soils, well cultivated. Suitable manure: Ammonia, 8 per cent.; phosphoric acid, 10 to 14; potash, 2 to 4.

Barley and oats likes open, free loams. Dress with superphosphate.

Turnip: Sulph. of iron destroys the mildew. Give farmyard manure.

Potatoes: Iron sulph. destroys infestans. Give potash and nitrogen.

Beans and peas like stiff, well-drained clays.

Sainfoin: Grows well on poor soils that are calcareous.

Lucerne: Thrives best on deep, loam soil well limed.

Chicory: Deep cultivation on loam and well manured with complete compounds.

Beet for Sugar: Iron sulph. is a good top dressing with farmyard manure.

Grass: Nitrate of soda, sulph. of ammonia promote grasses.

Clover: Bone dust, superphosphates and kainit promote clovers.

Turin Grass: Supplies winter herbage.

Meadow Foxtail: Grows on poor, dry soils.

Yellow Oat Grass: Good for sheep.

Cocksfoot: Grows on all soils; hardy.

Hard Fescue: Good for sheep. Stands the winter.

Rye Grass: Makes weight and bulk.

Lucerne, Vetch (Ladies' Finger), Common Vetch: Make mixed good forage crops of high value.

On some of our lands that are poor and tufty in Northern Natal it is well to broadcast mixed grasses as above and manures of a complete mixture as most of the soils vary so much as to have three or four different qualities in a field of a few hundred acres. The Board of Agriculture should at any time be able to test for buyer any sample of manure as to its fertilising qualities, but as far as I can see by visiting the farms it is safest to use mixed complete compounds rather than isolated bodies.

FOOD VALUE OF PEAS.—It is a somewhat regrettable circumstance that the pea, which is one of the most nutritious articles of food, does not meet with a greater measure of popularity. From the proteid standpoint it is much superior to oatmeal, being some 80 per cent. richer in this substance than the latter, with a high percentage of carbohydrates and a small proportion of water; in fact, the pea is an ideal edible, since it possesses practically the whole of the constituents in correct proportions for the building up of animal tissue. No doubt during the summer season peas are extensively eaten, though it is to be feared they are regarded more as a tasty pseudo-epicurean dish than as a staple article of food. But it is during the winter that their advantages can be more strikingly secured. During the past few years inventive effort has succeeded in devising satisfactory means of preserving the results of summer cultivation in an appetising form without any recourse to pernicious colouring or preservative mediums. Formerly out-of-season peas were either stored in bottles or tins in conjunction with deleterious conserving fluids, the dangerous character of which was betrayed by the vivid verdant hue of the contents, or they were sold in a dry form, packed in sacks, which certainly presented an uninviting appearance. Such antiquated methods have, however, now given way to hygienic and more attractive means of supplying the market. The peas, carefully selected, graded, and dried, are now packed in air-tight card boxes, in which they will retain their qualities for a considerable time, and when properly cooked yield a dish in every way as alluring to the palate as those freshly garnered from the field or garden in the height of the season.—*Chambers's Journal*.

The Care of Farm Machinery.

THE farmers of this country buy annually over £23,000 worth of farm machinery. There is perhaps no other source of loss so great to them as that produced by the way they care for this machinery. According to statements made by different United States manufacturers, farmers would not have to buy over one-half of this amount of machinery, providing they took the proper care of it.

The *Gas Review*, in a recent issue, discusses this important subject, as well as giving some useful advice regarding the care of farm machinery, which a number of our farmers would do well to study. In the opinion of our contemporary, as a general rule, the prosperity of a farmer may be estimated by the way he cares for his machinery. Poor care indicates shiftlessness, waste, lack of energy, and the buying of more implements in a short time. Good care, on the other hand, indicates prosperity, development, bank deposits, and long-lived machinery.

One of the first essentials to the handling of machinery is to thoroughly understand all parts and to be able to adjust them for best working conditions. By running a certain implement with one or more of its parts out of adjustment, there is danger of damaging other parts by throwing unequal strain on them, besides ruining the part which is not adjusted.

The draft of an implement is affected very much by its condition. A dull plough requires about one-fourth more energy to pull it than one which is in good condition. Poorly adjusted implements sometimes pull twice as hard as they should, and in so doing not only wear out the horses, but at the same time do poor work at a loss of time, with damaging results to the machine.

Another very important point in caring for farm machinery is to properly oil all working parts. It has been wisely said by O'Brien, that "Oil is the cheapest machinery we have." The farmer must not only know how and where to oil every moving part of his machine, but he must oil it. The fact that some parts need a great deal more oil than others must not be overlooked. Some parts that are handy will receive more oil than is necessary, while other parts which are not so handy are neglected almost altogether.

Sometimes oil holes will become clogged with dirt, and while they may appear to be open, still do not convey the oil to the wearing parts; this will often result in serious damage. In other cases, certain machine have been condemned by operators simply because one or two oiling places had been entirely overlooked.

Iron wearing on iron must be covered with a film of oil to prevent

cutting. The oil, then, prolongs the life of the machine, besides making it of lighter draft.

New machinery should be watched constantly to prevent the loss of bolts and small parts, as such parts will work loose during the first season's use. Certain boxes or bearings may fit too tightly, thus causing them to heat, while others may need tightening. There is nothing that will shorten the life of farm machinery more than the carelessness of not keeping all nuts, screws, and lugs tight.

A wrench should always be found in connection with machines which are in operation, and it should be used when necessary.

Good reasoning tells us that there are but two times during the year that farm machinery needs any special care. First, when it is in use. Second, when it is not in use.

One season without shelter will damage farm machinery more than the wear caused by its use during the season. The action of the weather which will cause a rusting of the iron and steel, as well as the rotting of the wood parts, will seriously interfere with the working of the machine when it is again put in use. By this exposure, certain parts are very much weakened and the machine becomes of shorter life.

When the season's work with a certain machine has been finished, it should be thoroughly cleaned and all parts that are liable to rust should be carefully wiped with oiled waste or an oiled rag. It is a good idea to coat these parts with either tallow or a good grade of axle grease.

After carefully putting away the greased parts, the implement should be stored in a shed of some kind, rather than be left in the open.

The farmer who takes proper care of his implements not only houses them and keeps them in good adjustment, but he paints them occasionally. Paint closes all cracks and keeps out the moisture. It not only preserves the wood, but the iron parts are benefited as well. It also gives the tools a much better appearance.

Before applying new paint, remove all old paint that is likely to scale off and see that all parts are thoroughly clean and dry.

A good grade of carriage paint will give best satisfaction on farm implements. Two gallons of this paint need not cost over a pound and will cover all implements needing paint on the average one hundred and sixty acre farm each season. The paint may be applied during slack times of the year at very little cost for labour.

To be successful with poultry it is essential to have a love for it, for without it, it is mere drudgery, and drudgery seldom meets with success.

Hints on Breeding, Rearing and Fattening Pigs.

By CHR. LANGKILDE, *Manager, Nel's Rust Pig Farm, Harrismith, and*
KARL LAURIDSEN, *Manager, Nel's Rust Bacon Factory, Ltd., Nel's Rust.*



HARDLY one hundred years ago it was, in many places in Europe, looked upon as a disgrace to associate with people who kept pigs. This animal was generally described as "stupid, bad-tempered, and dangerous, and with which no respectable person should have anything to do." If a farmer kept pigs he was looked upon as being on the certain road to poverty. A Danish author writes in 1803: "The peasants in Zealand keep far too many pigs. They are the most destructive animals one can imagine. During the first year they only grow to the size of an ordinary cat; wherefore, they have to be three years old before they are fit to be killed."

To illustrate how times have changed we shall take Denmark as an example. Here the export of bacon has, during the last few years, averaged about 170,000,000 lbs. at a value of £4,000,000 sterling per year. In 1894 the export was only 74,000,000 lbs. bacon, or nearly 100,000,000 lbs. less than at present. England imports yearly more than 500,000,000 lbs. bacon at a value of nearly £14,000,000 sterling. Of this Denmark sends about 21 per cent. of the bacon, and as this is recognised as being of better quality than that of other countries it receives 25 per cent. of the total value. This, considering the country is small, is a very satisfactory result, and it has only been reached through a most careful management of the pig-breeding and fattening on the farms and the working of bacon factories all through the country. The first of these was erected in 1887; now there are over 50 factories, killing more than 2,000,000 pigs yearly.

Here in South Africa one often hears farmers say that pigs do not pay and are only a terrible nuisance on the farm. But that is hardly to be wondered at when the condition is seen under which such pigs are kept. In many cases the sty consists of a deep hole dug in the ground, not always well drained and just large enough for the pig to turn himself around in. The pig is put in this hole when quite small, and here he has to remain until ready for sale, being fed mostly on mealies, pig-weeds, etc. Other sties consist of small stone kraals, with perhaps a sheet or two of corrugated iron as shelter. On summer days, when the stones and iron get burning hot, the pig has, as a rule, no chance of a mud bath or any way of cooling himself, and on cold winter

rights he has, as often as not, no bedding to creep in under. But still here, as well as in the mud hole, he is expected to pay.

Now, however, that large dairies are being erected all over the different colonies, followed here and there by bacon factories, the farmers begin to realise the necessity of proper pig-breeding and fattening as a means of utilising skim milk, buttermilk, and other waste products. Through its quick growing and early development the pig pays well for good care and feeding. Where they have been well housed and fattened with care it is an uncommon thing to see pigs five months old weighing 180 to 190 lbs.

The following short notes on care, feeding, and ordinary rules for producing proper bacon pigs may be found useful:—

BREEDING.

Choose for breeding purpose amongst the young pigs the best-built and most powerful animals bred from strong and healthy parents and see that the sow pigs have at least twelve teats.

Feed them well, but do not let them grow fat, as a fat sow makes a large and neglectful mother.

If the young pigs have to be kept in enclosures make these as large as possible so as to give them the opportunity of plenty of exercise, but give them a well-sheltered and dry sleeping place.

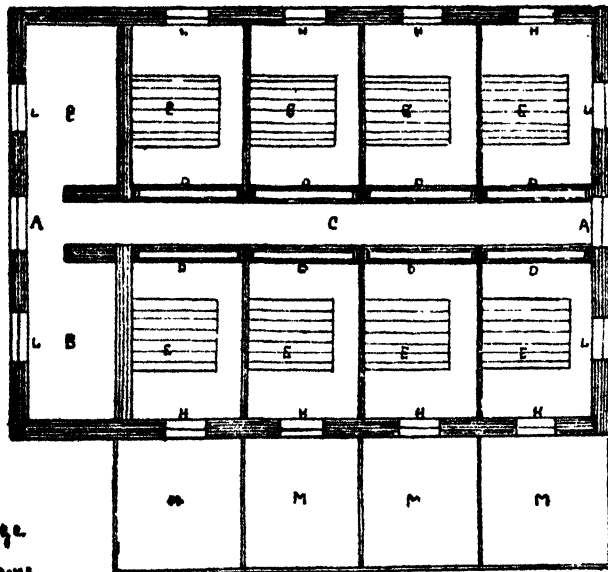
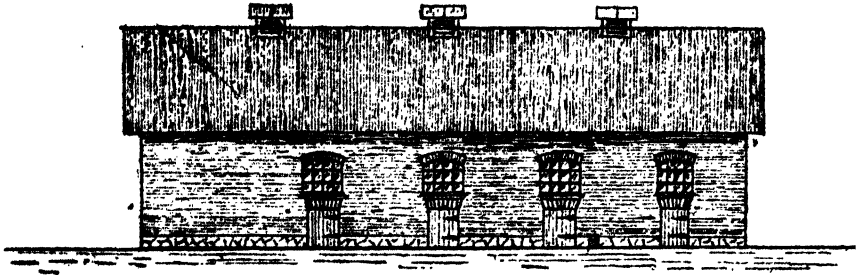
Do not let the sows be covered by the boar before they are well developed and at least eight months old. The boar should not be used before ten months old, and then for the first few months only for a limited number of sows.

Keep the boar away from the sows when not required, and feed according to the service wanted of him. If well fed and healthy a boar can, when kept apart from the sows, serve about 200 sows yearly. If allowed to remain with the sows he can only serve one-third of that number.

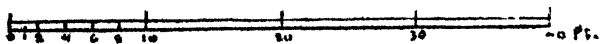
When the sow is brought into the boar's sty for service it is sufficient to let the boar cover her once, then take her away. To prevent accidents, make the floor in the boar's sty, if the sows are brought there for service, even, firm, and with a surface that will prevent slipping. Feed the sow, until a couple of weeks before it is expected to farrow, on cheap waste, green weeds, etc.

While it is rearing the little ones the sow must be fed well: skim or buttermilk, grain, and, if possible, a little green fodder or potatoes. It must be remembered that a litter of ten pigs will consume, when they are a week old, nearly four gallons of milk daily, and unless properly fed with substantial and concentrated food the sow will not be able to yield a sufficient quantity of milk.

It is important that the sow's food, during the first couple of weeks



- A. Main Doors
- B. Store Rooms
- C. Feeding passage.
- D. Troughs
- E. Sleeping platforms
- L. Windows
- H. Small doors & windows
- M. Open Runs



PLAN OF FATTENING STIES TO CONTAIN ABOUT FIFTY PIGS.

after farrowing, shall be fresh, as old and sour food will influence the milk for the little ones and give them diarrhoea.

It often happens that the litter of young pigs is not "even," but that one or two are much smaller and weaker than the rest. Those should, on the first day after their birth, as often as possible be put to the sow's foremost teats, which give the most milk. They will then quickly be used to drink there (it is a well-known fact that each little one chooses its own special teat), and in time reach the average size of the others.

Let there be a flat trough in the sty from which the young pigs at an early age can get accustomed to eat and drink. Castrate the young boars early (when three weeks old); they suffer less and get time to recover before weaning.

WEANING AND REARING OF THE YOUNG PIGS.

Do not take the little ones away too early from the mother sow; they must first be well used to eat and drink, and be at least five or rather six weeks old. If the sow has had a large litter, and yielded a lot of milk, it is desirable to take away half of the young ones first and some few days later the rest.

It is now the most difficult period for the young pigs, and the farmer must try to help them during the first few days after they have been taken away from the mother sow. The extra trouble and expense will be repaid many times by getting quick-growing and healthy young pigs instead of miserable, stunted animals with large heads and big stomachs, scabby, unhealthy-looking skin covered by vermin and dirt. As they have been used, while being with the sow, to drink many times daily, the young pigs must, during the first few days after weaning, get fresh food six or seven times during the day. The following rules are important in rearing the young pigs:—

Feed often, but do not give them more than they can consume each time.

Clean the troughs before giving the food, which must be fresh and of even temperature, not too cold.

Give them a good open run for exercise, but let them have a dry and well-sheltered sty for sleeping place with sufficient bedding for them to creep in under during cold weather.

FATTENING.

When the pigs are three or four months old and healthy they are fit to go into the fattening pens. These should be placed in one building and well protected against rain, wind, and sudden great changes of the temperature.

The walls should be built from stone or brick; do not use corrugated iron, which is far too hot in summer and too cold in winter. For the



THE DUNMOW FLITCH BACON FACTORY. -IV.

Curing Cellar, showing sides of Essex Bacon lying in the cellar in process of curing.

(See Article.)

floor use slates or, still better, hard-burned bricks laid down with cement; this will make it rat proof and also prevent the urine soaking through down into the ground, which then would be made sour and cause a bad and unhealthy smell. Give the floor a slight fall towards a 2 in. or 3 in. pipe leading through the wall. The urine and spillage should then run out into a gutter leading to a properly-built well. In the one side of the sty there should be a raised wooden platform for sleeping place, as this is warm and dry; no bedding is then required.

The most suitable roof is thatch, made from grass or reeds. Plenty of light is necessary for the pigs' health and comfort; therefore, place a sufficient number of windows in the wall, and, for the sake of regulating the ventilation, make them of a kind to be partly and fully opened.

Give a further constant ventilation to the whole building by leaving a small open space between roof and walls.

There should not be more than ten or twelve pigs in each sty, and this should be large enough to give each pig fourteen to sixteen square feet of room.

If open runs are made outside it is advisable not to use them during the fattening period, as it has been proved by experiments that a sum of 1½d. has been saved on each 4 lbs. gain of flesh by preventing the pigs from taking exercise in the open.

As far as possible prevent any excitement and restlessness amongst the pigs, as this decreases their growth; therefore, feed them three times a day, at regular hours, so as not to keep them waiting for their food, and also see that the animals are kept quiet and undisturbed between the meals.

The food during the fattening period should be as cheap as possible, and at the same time of such quality that it is easily digested, produces good bacon, and is well liked by the pigs.

Milk, either as buttermilk or skim milk, is a capital food, nourishing, and easily digested. In feeding value one gallon is equal to about 2 lbs. of grain.

Mealies, on account of cheapness, are used extensively here in South Africa. The pigs like and thrive well on it, but given in too great quantities it produces soft and "oily" bacon. It has, however, none, or very little, effect on the quality of the flesh if only used during the early stage of the fattening period and substituted during the last three or four weeks with barley, rye, or peas. The mealies are most economically used when ground and boiled into a porridge.

Potatoes and mangel worzels can be used profitably, and produce bacon of excellent quality. Potatoes should be given boiled and the mangels in a finely-cut-up form.

Waste blood from pigs (which bacon factories should be able to supply at about 2d. per lb.) when boiled is a strongly nourishing food.

The pigs do not care much for the taste, but mixed with the other food it is to be recommended.

It is not advisable to give much water; it "fills up," but is not fattening at all, and only decreases the pigs' appetite for the necessary substantial food.

The easiest and most profitable way of giving the different kinds of food is to mix them all together in a vat to be covered up and thus left to "ripen" for at least twelve hours, during which time it should be stirred once or twice.

Give the food three times a day and in such quantity that the pigs get satisfied without leaving any food in the troughs after finishing their meal.

As a suitable proportion in which the different kinds of food should be mixed the following can be recommended:—40 per cent. buttermilk or skim milk, 30 per cent. grain, and 30 per cent. potatoes or mangels.

The fattening period should, if properly managed, not extend over more than nine or ten weeks, and be carried on at an expense of 1½d. to 1¾d. per lb. flesh gained.

When the pigs are being transported to the factory great care should be taken that no ill-treatment and hustling takes place; all beating of the animals with whips or sticks must be strictly prevented as causing great loss in value.

ORDINARY RULES.

If a farmer has to keep his pigs in enclosures, he should at some distance from there erect a small "hospital," where pigs showing any signs of disease should at once be taken.

Cough is a common complaint amongst young pigs, and in most cases caused by their sleeping place being damp. It is, as a rule, not dangerous, but by preventing the pigs from growing in the ordinary way it often causes a heavy loss. Remove the affected animals to high and dry ground and disinfect the sties.

Prevent measles by keeping your sties, runs, and troughs clean.

Always leave in the sty or enclosure a trough with ash or, still better, charcoal.

Choose for pig farming well-bred animals; they develop and fatten in far shorter time, and produce a much more superior bacon than inferior breeds.

The following breeds are the best known and easily obtained:—

White Pigs: Large Yorkshire and middleweight Yorkshire.

Black Pigs: Berkshire and large blacks.

Red Pigs: Tamworth.

It is considered by many that white pigs give the finest quality of meat, but a very good class of bacon is also produced from first crossings of Berkshire—Tamworth and Berkshire—large blacks.

Strictly prevent all in-breeding.

The Use of Milk as Food.

REVIEW BY U.S. INVESTIGATIONS.

QUESTIONS pertaining to the care and management of dairy cows, the effect of different systems of feeding on the yield and quality of milk, the distribution and marketing of milk, the manufacture of butter, cheese and other dairy products and related questions have been studied by investigators all over the world, and some of the most interesting results have from time to time appeared in the pages of the *Journal*. The Dairy Division of the Bureau of Animal Industry of the United States Department of Agriculture has carried on the most extensive investigations of a great many problems of milk and its products, and this investigational work is quite apart from the large amount of work in the same direction that is carried out at the various Experiment Stations all over the United States.

The results of these investigations carried on by the Bureau of Animal Industry have been gathered together by Mr. R. D. Milner, Ph.B., Assistant in Nutrition Investigations, U.S. Department of Agriculture, and published in a condensed and popular form in Farmers' Bulletin No. 363 of the Department. The amount of space which we can devote to a discussion of the bulletin is limited, and we do not think we can do better than let Mr. Milner himself summarise the results of the experiments he deals with, which he does in the following clear and concise manner.

Some idea of the importance of milk as human food may be gained from the fact that about one-sixth of the total food of the average family is furnished by it and its products. Milk from various mammals is used in various parts of the world, but with us that of the cow so far surpasses all other kinds in importance that unless otherwise specified the word "milk" is taken to refer to cow's milk only. Few staple foods vary so much in composition, but, on the average, good, unadulterated milk should contain about 87 per cent. water and 13 per cent. solids. About one-fourth of these solids are furnished by the protein compounds, casein, and albumin, the casein being five or six times more abundant than the albumin. Fats (butter fat) form one-third of the total solids. Butter fat occurs in globules throughout the milk, and it is upon the size and number of them that the creaminess of milk depends. The larger the globules the more easily and completely will they rise as cream to the surface of the milk. Carbohydrates make up 38 per cent. of the solids, by far the most important of them being lactose, or milk sugar. The remaining 5 per cent. of solids con-

sists of mineral matters, the bulk of which are phosphates and chlorides of soda, potash, and lime.

Besides these chemical constituents, milk almost inevitably contains bacteria of many kinds and in varying numbers. They cause the scuring of milk and the ripening of cream and cheese, and produce many other changes in the appearance and flavour. The number present in freshly-drawn milk varies enormously with the conditions of milking, and, as they are greatly increased with dirty and careless handling, cleanliness in all matters pertaining to the milking and marketing of milk and keeping it in the home cannot be too strongly insisted upon. Disease germs, notably those of typhoid, diphtheria, scarlet fever, and tuberculosis, may also be carried in milk, so that the purity of the milk supply is of vital importance to every family and community.

Although some of the bacteria in milk are essential in the manufacture of butter and cheese, they are as a class a source of danger to the ordinary consumer. Without them milk would stay sweet indefinitely, and the problem of keeping is simply one of checking their growth. They are comparatively inactive at a temperature below 50 deg. F., and therefore milk should be kept in a cool place. Freezing does not kill bacteria and produces undesirable changes in the milk. Extreme heat does kill them, but also produces other undesirable changes. Nevertheless, heat is employed to preserve milk in the two common methods of pasteurisation and sterilisation. In the former the aim is to apply heat in such a way as to kill the most bacteria without producing the undesirable changes; in the latter, to apply enough heat to kill all the bacteria, but with the least possible undesirable change. Bacteria require moisture as well as heat for their growth, therefore by extracting the water, as in condensed milk, milk powders, etc., milk may be preserved indefinitely. Another way of keeping it is by the use of chemicals to kill the bacteria, but as such chemicals may be injurious to human beings as well, such practices are not usually to be recommended.

What is commonly known as the richness of milk depends upon the amount of fat. This varies so greatly in milk from different animals and is so easily reduced by a fraudulent dealer that many efforts have been made to regulate the price of milk according to its fat content. Milk graded according to government standards is sold in some cities, especially in Europe. Certified milk—that is, milk in sealed jars from establishments regularly inspected—is more commonly known in the United States, and rightly commands a higher price than that from uncertain sources. Of course, cleanliness and care are as important in keeping milk in the home as in the dairy market, and each housekeeper should see to it that all receptacles in which it is kept are thoroughly

scalded each time they are used; if this is neglected bacteria from the old milk will contaminate the fresh.

Compared with other food materials, milk furnishes the nutritive ingredients in forms in which they may be easily and thoroughly digested by the normal, healthy person, and often by those of impaired health. Boiling is believed by many to make the protein slightly less digestible, but as yet knowledge on this point is incomplete. The digestibility of the fat seems to depend upon the size of the globules, the smaller ones being more easily absorbed. This explains why rich, "creamy" milk, such as that given by the Channel breeds, sometimes causes digestive trouble in children.

Milk contains too much water to be a perfect food for adults; nevertheless, its solids furnish all the necessary ingredients and in good proportions. A large glass of it yields as much nourishment as a slice of roast beef.

Unless exceptionally high prices are paid for it, milk is fully as economical a source of nutrients as other animal foods, but dearer than most staple vegetable products. It should be borne in mind, however, that it requires no preparation, has no waste, and is more thoroughly digested than most vegetable foods. As a source of protein, the most expensive of the nutritive ingredients, it is especially economical. Skim milk, which is whole milk minus part of its fat, and which costs only half as much as whole milk, furnishes protein about four times as cheaply as beef, and since fat is usually abundant in the ordinary mixed diet might also advantageously be used in place of whole milk in dietaries where cost must be carefully considered. The freer use of skim milk in cooking is also to be recommended. Of course, foods prepared with either skim or whole milk are by so much the more nutritious than those prepared with water.

Butter and cheese are the most important milk products. Butter is one of the chief sources of fat in the ordinary diet and furnishes it in a very palatable and easily-digested form. Cheese consists of the casein of milk plus more or less of the fat and mineral matters. The flavour and texture of the many varieties are due mainly to the peculiar bacteria and ferments which the various methods of manufacture develop. The less expensive varieties make one of the cheapest sources of protein, and might well be more freely used as part of the regular diet. Digestion experiments indicate that the common and milder varieties are more easily and thoroughly assimilated than is sometimes supposed. The other milk products—junket, whey, buttermilk, clabber, and the fermented forms, such as kephir and kaumiss—are all nutritious foods and are often of special value in invalid diet. In short, milk and its products are fully entitled to their prominent place in our food list as comparatively inexpensive, easily-digested sources of all the necessary ingredients of our diet.

Maize for the Home.

SOME MORE RECIPES FOR MEALIE DISHES.

IN our October and November issues of last year we published a number of useful recipes for the preparation of dishes with maize and maize products. A "Farmers' Bulletin" issued by the Transvaal Department of Agriculture has now reached us containing a number of further recipes which we think will be found useful by our readers. The recipes in the bulletin are divided into Breakfast Dishes, Luncheon Dishes, Dinner Dishes, and Cake Dishes; and we propose to publish them in instalments under these heads. This month we publish the recipes of breakfast dishes; next month will appear "Luncheon Dishes"; and in a later issue we will give the recipe for dinner dishes and cakes.

I.—BREAKFAST DISHES.

MAIZE MEAL MUSH.

Put two quarts of water into a dinner-pot or stew-pan, cover it and let it become boiling hot over the fire; add a tablespoonful of salt, take off the light scum from the top, have nice fresh yellow or white maize meal; take a handful of the meal with the left hand and a pudding stick in the right, then with the stick stir the water around and by degrees let fall the meal; when one handful is exhausted refill it; continue to stir and add meal until it is as thick as you can stir easily, or until the stick will stand in it; stir it a while longer—let the fire be gentle—and when it is sufficiently cooked, which will be in half an hour, it will bubble or pull up, then turn it into a deep basin. This is eaten hot or cold, with milk or with butter and syrup or sugar, or with meat and gravy, the same as potatoes or rice.

FRIED MUSH.

Make maize meal mush. Turn it into bread tins and, when cold, slice it; dip each piece in flour and fry it in lard and butter mixed in the frying-pan, turning to brown well on both sides. Must be served hot.

HOT CAKES.

Ingredients.—4 Cups sour milk; 2 level teaspoonfuls bi-carbonate of soda; 1 tablespoonful melted butter; maize meal; salt.

Take sour milk, add soda, a little salt, and sufficient maize meal to make a thin batter. Beat well together and fry on hot griddle (frying-pan) as pancakes.

MAIZE PANCAKES.

Ingredients.—1 Pint maize meal (or 2 cups); 1 tablespoonful salt; 1 tablespoonful bi-carbonate of soda; 4 eggs; $\frac{1}{2}$ cup wheaten flour; buttermilk (about 2 cups).

Take maize meal, mix in salt and soda, and pour on enough boiling water to make a thick porridge; let it stand until cool; add the yolks of eggs, flour, stir in as much buttermilk as will make batter; beat the whites of the eggs and stir in. Fry on the top of the stove in a well-greased frying-pan.

MAIZE FLAPJACKS OR PANCAKES.

Ingredients.—1 Quart sour milk or buttermilk (or 4 cups); 2 eggs; 1 teaspoonful salt; 2 teaspoonfuls bi-carbonate of soda; 2 tablespoonfuls golden syrup or treacle; 1 tablespoonful melted lard; $\frac{1}{2}$ cup white wheaten flour; maize meal.

Take milk, add eggs lightly beaten, salt, soda mixed in warm water, golden syrup, melted lard, flour, and add enough maize meal to make the batter thick. Drop a small spoonful of the batter on to a well-greased, hot frying-pan; brown on both sides and serve immediately.

MAIZE GRIDDLE CAKES.

Ingredients.—2-3rd Quart mealie meal; 1-3rd quart wheaten flour; 1 teaspoonful moist sugar; $\frac{1}{2}$ teaspoonful salt; 2 teaspoonfuls (heaped) baking powder; 2 eggs; 1 pint milk.

Sift together mealie meal, flour, salt, sugar, baking powder; add eggs and milk, mix in smooth batter and bake on very hot griddle to a nice brown. Serve with molasses or syrup.

MAIZE MEAL CAKES.

Ingredients.—1 Pint sour milk; 1 pint cream; 2 eggs; 1 teaspoonful bi-carbonate of soda; maize meal.

Take enough maize meal to make a thick batter; throw the salt into the meal, then stir in the milk and cream slowly, beat the eggs and add them; lastly, put in soda dissolved in a little hot water. Bake one hour in shallow pans well buttered.

MAIZE CAKE.

Ingredients.—3 Cupfuls maize meal; 1 teaspoonful salt; 1 tablespoonful slugar; 1 tablespoonful butter; 1 egg.

Take maize meal, salt, sugar and butter, and wet this with boiling water; then beat in egg; spread half an inch deep on butter shallow pans, and bake brown in a quick oven. This is delicious.

MAIZE GEMS.

Ingredients.—1 Pint (or 2 cups) maize meal; 1 pint flour; 1 teaspoonful salt; 2 teaspoonfuls baking powder; 1 tablespoonful lard or dripping; $1\frac{1}{2}$ cups milk and water mixed.

Sift the maize meal, flour, salt and baking powder, add lard or dripping, then milk and water to make a firm batter. Bake in small muffin tins in well heated oven for 15 minutes.

MAIZE DODGERS.

Ingredients.—3 Cupfuls maize meal; 1 teaspoonful salt; 1 teaspoonful sugar.

Pour on boiling water enough to wet the maize well and let stand for half an hour. Then add the other ingredients. Make into small flat cakes about an inch thick and fry in boiling fat until brown. Twenty minutes. To be eaten very hot.

MAIZE PONE.*

Ingredients.—1 Cup maize meal; $\frac{1}{4}$ teaspoonful salt; 1 cup water; 1 tablespoonful lard.

Rub the salt and lard into the meal, add the water and mould into a roll between the hands, flatten a little and start the baking where the top heat is greatest to prevent cracking.

NEW ENGLAND JOHNNY CAKE.

Ingredients.—1 Pint (2 cups) maize meal; 1 pint white flour; $\frac{1}{2}$ cupful sugar; 1 tablespoonful lard; 2 teaspoonfuls baking powder; 3 eggs; $1\frac{1}{2}$ pint sweet milk.

Sift together maize meal, flour, sugar, salt and powder; rub in lard cold, add beaten eggs and milk; mix into firm, smooth batter, pour into shallow cake pan and bake in a rather hot oven for about 45 minutes.

SPIDER MAIZE CAKE.

Ingredients.—1 2-3rd Cup maize meal; 1-3rd cup flour; $\frac{1}{4}$ cup sugar; $\frac{1}{4}$ cup butter; 1 cup sour milk; 1 cup sweet milk; 1 teaspoonful salt; 1 teaspoonful (small) soda.

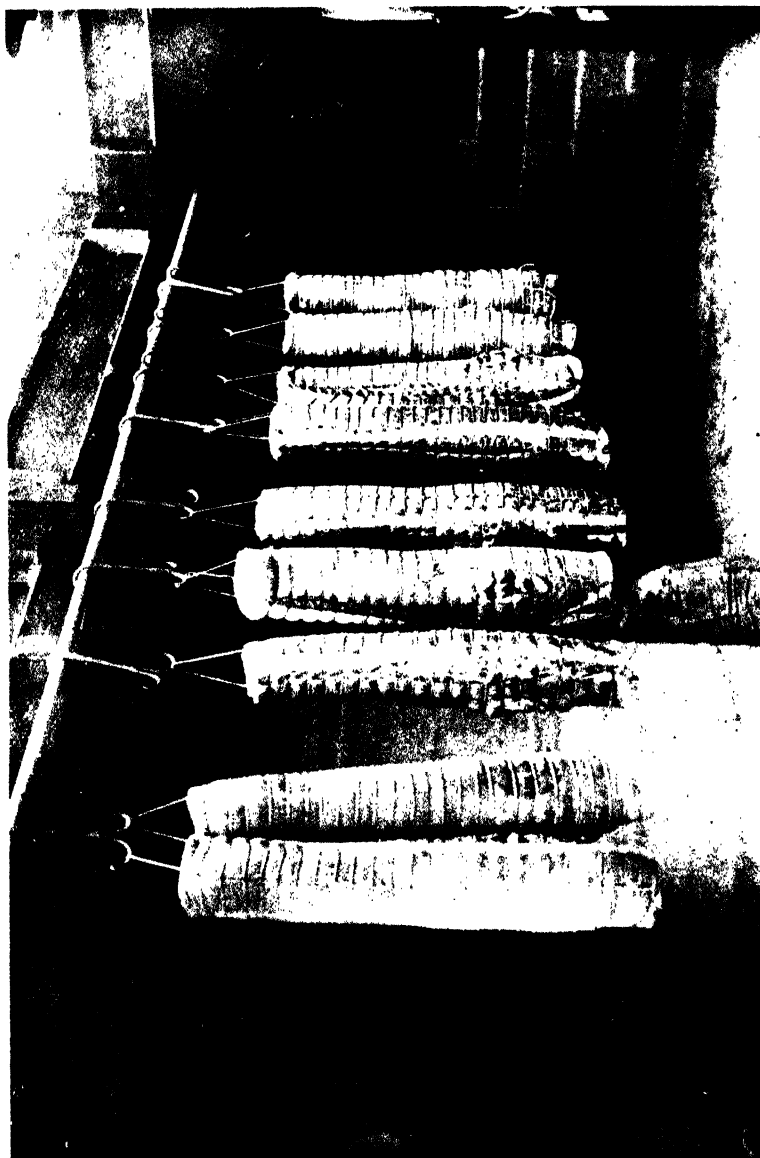
Beat the eggs till light, add sour and sweet milk, and stir into the dry ingredients. Mix thoroughly and pour into frying-pan in which butter has been melted. Tip the pan (first) from side to side to oil evenly with the butter. Bake about half an hour on top of stove.

MAIZE BREAD (1).

Ingredients.—3 Cups mealie meal (sifted); 1 cup white flour; 3 cups sour milk; 1 egg; $\frac{1}{2}$ teaspoonful salt; 1 tablespoonful molasses (syrup) or sugar; 1 teaspoonful soda (large); 2 tablespoonfuls dripping or butter.

Mix all together except the flour and soda, sift soda with flour into the other ingredients. Bake in a hot oven for 30 or 40 minutes in a well-greased tin. This quantity makes a large and a small loaf.

* A kind of Johnny cake.



THE DUNMOW FLITCH BACON FACTORY.—V.

Essex Rolled Bacon.—While the kind of bacon produced generally at this factory will be in the Wiltshire style, there will be other specialities such as rolled bacon, hams, middles, etc., and the illustration shows some of the rolls already produced.

(See Article.)

MAIZE BREAD (2).

Ingredients.—1 Cup sour milk; 1 cup maize meal; 1 teaspoonful salt; $\frac{1}{2}$ teaspoonful bi-carbonate of soda; 1 cup white flour; 2 eggs; 1 tablespoonful (large) sugar; 1 tablespoonful (large) dripping or melted butter.

Mix the meal and sour milk over-night, add the other ingredients in the morning, and the soda dissolved in a little water, the last thing. Pour to thickness of one inch into shallow buttered pans and bake.

MAIZE BREAD (3).

Ingredients.—2 Cups maize meal; 1 cup flour; 1 teaspoonful cream of tartar; $\frac{1}{2}$ teaspoonful bi-carbonate of soda; 1 cup sweet milk; $\frac{1}{2}$ cup sugar (small); 2 eggs.

Take maize meal and pour on enough boiling water to wet it all; cover and let stand till morning; then add flour and cream of tartar sifted together dissolve bi-carbonate of soda in milk, and stir with meal and flour; add sugar, and lastly put in eggs well beaten (yolks and whites separately). Bake in quick oven.

COUNTRY MAIZE BREAD.

Ingredients.—1 Cupful (small) mealie meal; 1-3rd cup sugar; $\frac{1}{2}$ teaspoonful salt; $\frac{1}{2}$ teaspoonful bi-carbonate of soda; 1 egg; 1 cupful thick sour cream.

Sift together maize meal, sugar, salt, and add soda dissolved in a little warm water. Beat egg, add to it cream and stir into the dry ingredients. Bake in a shallow buttered pan for twenty-five minutes. Cut into squares and serve.

OHIO MAIZE BREAD.

Ingredients.—3 Tablespoonfuls butter; 3 tablespoonfuls sugar; 2 eggs; $\frac{1}{2}$ teaspoonful salt; 1 cupful sweet milk; 1 cupful flour; 1 cupful maize meal; 3 teaspoonfuls (level) baking powder.

Rub to a cream butter and sugar add eggs and beat until mixture is light. Then add salt and milk and mix well together. Sift together flour, maize meal, and baking powder, and add to the mixture in small quantities whipping until quite light. Bake 25 minutes (hot oven) in a round baking pan.

BROWN MAIZE BREAD.

Ingredients.—3 Cups maize meal; 3 cups Boer meal or rye; $\frac{1}{2}$ cup golden syrup; 1 teaspoonful (small) bi-carbonate of soda; 1 quart (or 4 cups) water.

Boil the water, add a little salt, stir in the other ingredients and boil in a tin steamer or pudding form for four hours.

(To be continued.)

Hints from the Hive.

By H. MARTIN.

IN continuation of my subject on the importance of paying careful attention to the seemingly small trifles in bee-keeping I would enumerate "feeding" as occupying an important place.

In classing it as a trifle I am not alluding to the necessary feeding up of weak stocks at the end of the honey season, as at this period it is a positive necessity to give our stocks sufficient to ensure them against the few months of winter when no forage is available, at least in the uplands. Judicious feeding applies not only to giving our impoverished stocks a sufficiency against such a period, but it consists of supplying them also at such times as there is a dearth of bee forage during the summer months, when the demand on these stores is double, or even treble, what it is in winter. In some parts of Natal these periods are more frequent and of longer duration than in others; hence the necessity for individual beekeepers to study their own locality for themselves.

How often has it happened, for instance, that the beekeeper, on examining his stocks for the first time after the winter has passed, has found them with plenty of stores? Soon after fruit-bloom or some other available source of nectar came in, and for three weeks or a month our bees were well provided for and made the best of their opportunity. This is followed by a period when no forage is in bloom, often perhaps for another three weeks. If at the end of such a spell we have neglected our bees, and then open a hive, we are surprised to note at once the lightness of the combs we had supposed were full of brood or honey. The cause is a very natural one; when the nectar began to come into the hive freely the queen increased the egg output enormously, and as the supply of food kept up the hive soon filled up with brood, and this brood consumes a great quantity of food for the first nine days from when the eggs are laid. It will easily be seen what had become of the small surplus the bees had collected earlier. It is a very common thing to find the queen has ceased laying entirely during such dearth, for the simple reason that no nectar is coming into the hive, and this cessation in the supply to the worker army very often means that the bees are not in a condition to store honey in the supers when the first good flow takes place, and in consequence the beekeeper get no surplus for a couple of months later than he might have had his queens been kept laying steadily from the time they started. It is a golden rule in bee-keeping—weak stocks, no honey.

It will easily be seen what feeding at such a time really means. It

may be that each colony will not require more than a couple of pints of thin syrup to tide them over to a fresh natural supply; in fact, very often the moral effect has more to do in this matter than the beekeeper thinks. Bees, as everyone knows who knows anything about them, are very easily affected by conditions around them. A queen will suddenly cease laying if the nectar coming into the hive is cut off from any cause whatever, whether it be from weather conditions or the failure of the nectar source, yet a very small quantity of artificial stimulus in the shape of syrup will keep her encouraged and working—i.e., laying at full pressure. It is very easy to test the truth of this assertion by feeding one stock and leaving another unfed.

We must always bear in mind that there is a very heavy drain on the colony's strength at this season of the year (early spring) through the dying off of the bees that brought the stock over the winter, and therefore all the more necessary is it to induce the rapid increase in young bees to fill their places.

Another trifle which is very often neglected is a constant supply of water at all times, but more particularly in the early spring, before the rain fills the dried-up spruits. For my own part, I believe it is better to supply this need continually than to allow the bees to find it as best they can, unless we are sure that their own source of supply is satisfactory; very often there is a heavy mortality amongst bees through the necessity of obtaining water simply by the numbers that get drowned or lost on windy days. Therefore, I hold it is better to give a constant supply oneself than take any risk; besides, we are sure the water is what we would like them to have, which is not always the case when not provided for them. Being situated in a locality where overground water is scarce, I have a good opportunity of testing the need and the quantity a few colonies require, and it would surprise many beekeepers who have not had the same opportunity as myself. The amount varies very much with the condition of the weather and also the strength of the colonies, but during the recent parching weather I have known five colonies to empty a six-pint vessel in less than a day, which seems surprising. The demand is particularly great after a windy day, and I have seen bees on the water vessel almost when it was too dark to see them, simply because they were confined to their hive through high winds till after sundown. Similarly I have found them taking in water at five o'clock a.m., through the same cause, and when the sun was well up the water vessel and immediate vicinity resembled a small swarm when it so happened that the bees were confined longer than usual.

Bees can be trained (if I may use the word) to take water from anywhere we desire, and to accomplish this it is best to leave the vessel or vessels where we wish them to go on their first spring flight in quest of a supply. At this season they will be found hunting all over for it,

and as often as not will make their way to the vessels about the house for their first supply. At this stage a water-feeder left in a shady, quiet place and kept regularly replenished will draw them all the season, and even on wet days, when it is to be had on their own flight board, they will pass it over and go to the accustomed spot.

I have found a vessel that will allow a float to follow the water right down to the bottom the most useful, and the one the bees prefer themselves also, being less affected by wind than an inverted jar on a stage, and consequently more reliable. Yet another trifle, and one that may not seem of much consequence to many, are the drones. These gents, although a necessary evil, need not be tolerated more than is essential to the well-being of the apiary. Unless to the queen breeder or during the swarming season, we are very apt to regard the drone as an inconsiderable nonentity, of no service, but also of no harm. Such is not the case. From the day the drone egg is laid till he takes his ignominious exit from the clutches of three or four Amazon guards the drone is a heavy drain on the stores of the stock to which he belongs. They are very heavy consumers of honey. This must be apparent to anyone opening a hive with a good supply of drones. Long after all the workers have left off sipping their emergency ration on the supposition that the puff of smoke just then meant dissolution from their beloved home you will find the drone feasting, and they can keep on at it seemingly for an indefinite time.

No doubt the liberal use of foundation will restrict the number of superfluous drones, but there are times when bees will raise drones in spite of the exertions of the beekeeper, often removing the foundation before it is drawn out to do so, or building it in any corner of a hive or frame that will allow them space to do so, although I think it is seldom they remove drawn-out comb for this purpose. Therefore, it is always advisable, as far as possible, to give our bees full frames of drawn-out worker comb in the earlier part of the season, when bees are inclined to raise drones. Towards the end of the season, if we cut away the patches of drone comb from the frames, we generally get worker cells built in its stead, and in that manner get good combs for the following spring—that is, if the frame is not too much drone comb to make it worth the trouble of saving it. A good drone trap will clear a hive in a few fine days so that one will suffice for a small apiary and soon save its cost in the saving of honey.

In the beginning of November I trapped over 1,800 drones from one hive in two days. Very poor economy in practice from one who preaches it, you may well exclaim, but the explanation is reasonable enough. The hive in question did not belong to my regular stock, but was hived by a friend and kept at his place till it was too late to remedy the defect. However, it is an instance of what bees will do in

drone-raising if left to follow their instinct. A couple of years ago I caught a small swarm from dear knows where; they just scaled three pounds. Seeing a lot of drones amongst them, I hived them through an excluder, and caught a pound of drones in doing so. But "a word to the wise is sufficient." While it is certain no hives run on modern lines can permit drone production to such an extent, there is no doubt but that most of our hives have more than is necessary for their well-being or the gain of the beekeeper. Of course, there is always the probability of a few queens being hatched as supercedures, but there need not be any anxiety on the beekeeper's part but that enough drones will always be on hand, even with the most sedulous care in destroying them, till the bees take on the job of doing so themselves, which is after the last honey flow, when many of the said drones will have revelled in the fatness, or rather the sweetness, of the hive for the greater part of six months.

Drones are indolent wasters who believe in getting the most pleasure out of life from the labours of others without contributing anything themselves. Therefore, why should they be tolerated more than is absolutely necessary for the best interest of the craft? They have not even the redeeming feature that is sometimes attributed to them in colder climates—that of keeping up the temperature of the hive. Such a necessity does not exist here when drones are in evidence; more often the opposite is the rule. If we cannot increase the amount of honey stored in our supers, this, I believe, is one of the ways we can prevent some that has got there already from being wasted.

A Bill "to exclude hares from the operation of the Game Act" (No. 8, 1906), is being introduced into Parliament by the Government this Session.

In terms of Section 3 of Act No. 54, 1906, the Minister of Agriculture has declared that the farm known as "C" of "Buffels Hoek," the property of Sir Duncan McKenzie, situated in the Impendhile Division, shall, for the purpose of the East Coast Fever Acts, be deemed to be a portion of the Magisterial Division of Lion's River, and all restrictions or regulations which now or hereafter may be in force in the Magisterial Division of Lion's River shall, in like manner, be in force as regards the said farm.

Vegetable Fibre in Wool.

IMPORTANT RECOMMENDATIONS.

A COMMITTEE appointed to deal with the question of vegetable fibre in wool met on March 25th, 1909, at Messrs. Dalgety & Co.'s offices in London to receive final reports from sub-committees and to draw up the recommendations which are to be issued to Colonial growers and wool handlers throughout the industry. There was a large attendance of the committee, representing every section of the industry, under the presidency of Mr. Reginald B. Jacomb.

Discussion took place on the various reports and on the results of the experiments which have been made by the sub-committees. Each recommendation was thoroughly discussed and revised prior to its adoption.

The following statement and recommendations were unanimously adopted:—

1.—In late years manufacturers and merchants have been greatly troubled with the increasing quantity of vegetable matter appearing in worsted and woollen goods after they had been dyed. Under the impression that defective sorting of the wool was the cause, they have blamed the wool merchant and the topmaker for not taking sufficient care. These latter people claim that quite as much and possibly more care than formerly is being taken. Investigation has proved that loose fibres and jute from bagging or string has been the cause of the trouble. When these are single or separated, it is impossible for the keenest eyes to detect them, and even minute pieces of canvas or small pieces of ravelled twine used in sewing the bags might get overlooked owing to the colour of these being very similar to that of the greasy wool. It has also been found where inferior bags have been used and the bale has been carefully stripped of its wrapper, that the exterior of the wool is covered with myriads of loose fibres of jute.

2.—The vegetable matter here alluded to must be understood to be altogether distinct from burrs. These are quite different in appearance and have to be treated by machinery, which process has been improved of recent years, but the straight fibres of which we speak can only be taken out after the piece has been dyed, involving tedious and careful labour by hand. It must never be imagined for one moment that the agitation about vegetable matter in wool has anything to do with trying to cheapen the cost of sorting. Actual figures show that as much or more is now spent upon sorting wool as ever before, while the cost of burling, or taking the white fibres out of the finished pieces, is ten times what it was a few years ago. Not only is it costly to take these undyed

fibres out of the cloth, but when they are taken out, they naturally leave defects in the cloth.

3.—That there has been a deterioration in the quality of the packing canvas or wool packs during recent years, seems to be admitted on all hands, but this lowering of quality has been so gradual that it has not been noticed from year to year. It is only when comparing the bagging with that in use say ten years ago that the difference is seen. Moreover it is noticed that the weaving is more open than formerly, and the yarn is less tightly twisted. Both these features cause the bagging to “fray” more easily and thus liberate loose fibres of jute. This is especially noticeable wherever a cut is made in the bagging such as is done when wool is exhibited for sale.

4.—Amongst the remedies for this evil which have been suggested to the committee and carefully considered by them are:—

The use of a superior quality of canvas and sewing string; of wool-lined bags; of cotton and paper linings; of dyed bags and dyed string; of wool sewing string; of singeing the canvas bag; of using sized or glazed bagging; of using metal fasteners to close the lid of the bag; of cross-dyeing the finished cloth, etc.

5.—Quite apart from any of these remedies there are ways by which those who handle wool before it reaches its ultimate destination could do something to mitigate the evils. It would be a great advantage if every bag was carefully turned inside out and shaken to remove casual pieces of bagging and string sometimes carelessly left in by the maker. The bag should then be turned back again. The greatest care should be taken in the shearing, classing and packing sheds, and in the sale warehouses, that no foreign fibres, straw, grass, hemp, etc., should come into contact with the wool.

6.—With regard to a superior quality of jute cloth, much could be done by using tighter spun yarn to weave into the bagging, and also by producing a closer woven cloth. It is quite evident that both these features would tend towards less fraying where the bag is cut, and that there would be less loose fibre on the wool as the result of the friction between wool and bag. A lighter cloth so made would no doubt stand the same strain of handling, and the cost of the bag need not be much more, as the saving of weight would influence the price. The same will apply to the string used for sewing purposes, which, like the tares, should be undyed, as the colour (red or blue) often proves fugitive and stains clean wool.

7.—Cheap cotton lining to bags has also been suggested and already adopted by some growers. There are dangers connected with this. When it becomes stained with grease it is of the colour of wool and should any small portion get overlooked it might work great harm. Of course, in

the case of wool or cotton lined bags, it becomes possible to use a cheap outside bag. The committee, however, after careful consideration, which has been confirmed by many outside opinions and protests, are compelled to deprecate the use of calico linings.

9.—On the other hand exhaustive experiments have been made with paper lined bags. In the case of ordinary thin paper, which has been but loosely attached with glue, the experiments have not been satisfactory. Specially prepared packs of a closely woven texture have, however, been produced with a thick corrugated paper lining, and the reports have been so unanimously favourable from buyers that the committee have no hesitation in giving these a high recommendation.

9.—Singeing the cloth to remove all loose or superfluous fibres seems to have advantages.

10.—Sizing the cloths leaves the impression that it is expedient which has more appearance than merit about it. In the rough usage of transit, etc., the glaze is apt to be rubbed off or dissolved. Sizing alone is an altogether insufficient remedy, and the committee considers the suggestion inadequate.

11.—Metal fasteners for closing the mouth of the bag have been suggested. While this is a step in the right direction, it does not get over the difficulty at issue, and does not materially assist in the solution of the question, besides introducing an element of danger in the handling. Moreover, they render the bale more easily liable to pilfering during transit.

12.—Dyed bags and dyed string have on the surface something to recommend them if all goods made from wool had eventually to be dyed black or dark colours, but as some of the fault arises from the rubbing of the wool in the bagging, and as these being single fibres could not be picked off, it follows that dyed fibres going forward into light-coloured goods would be a much greater danger than light hairs in dark goods, and the committee considers the suggestion quite impracticable. Coloured stripes on the bales are also considered objectionable.

13.—It is of course well known that vegetable fibres will not dye with wool, and the question of cross-dyeing, *i.e.*, once for vegetable and once of animal fibres, is also impracticable.

CONCLUSIONS.

In conclusion, the committee desires to record its extreme gratification with the manner in which a large number of Colonial growers have already interested themselves in this question; the response in the way of improved tares which have come on to the market during the present season has been as surprising as it has been gratifying.

Many tares, including cotton-lined, paper-lined, singed bags, and tares of improved quality, have come under the notice of buyers, and already there has been a marked improvement in the packing of many of

the best clips. The interest of buyers has also been stimulated, and it will be advantageous to sellers who use approved tares to have the fact stated in the catalogues.

It is obvious that the advantages of packing the wool in a satisfactory manner accrue to the grower, as a clip which has the confidence of users always has a preference over one not so well favoured. There may be a minute extra cost of packing, according to the desires of the users, but it appears to be more than compensated for by the advantages of good will, and further it is most improbable that anyone who takes a pride in his clip will send it to market in anything but the most merchantable form. Indeed, it could scarcely be imagined that any trade would send forward to market its commodities in any but the most attractive form to the buyer. Doubtless many buyers of good wools would not object to share in the extra cost if some equitable way could be found for this, but so far no feasible plan has been suggested. Many manufacturers continue to give additional testimony to the enormous extra expense entailed by the presence of this vegetable fibre, and whatever may be the difference of opinion as to methods and division of the small extra cost, the grower may be absolutely certain that in the ultimate reckoning, this extra cost of treatment is always a tax on the value of the raw wool, which falls ultimately on the grower.

The committee desires to urge that all growers will continue to assist in the efforts to obtain so very desirable an end. They would, however, emphasise once and for all that fact that cotton linings constitute an equally serious element of danger; in fact, the cotton threads are liable to fray and are even more difficult to eliminate than pieces of jute string.

The question of wool linings for packs has met with an unexpected check owing to the fact that 25 per cent. duty will have to be paid in Australasia. This means a cost of about 1s. 7d. each landed, but, of course, the cheapest packs may then be used as outer coverings. It is hoped, however, that the Government of the Commonwealth may see it way to cancel this, and negotiations are in progress with that object in view. Meanwhile, in the opinion of the committee, the wool lining furnishes a real remedy provided that the growers can find an easy and convenient method of manipulating these linings in the process of packing.

The various efforts made with paper-lined packs as previously stated have proved eminently satisfactory. The essential features are that the canvas should be sufficiently strong and not too thin; that the paper should be of the thick and corrugated type, which does not fracture; and that the paper be thoroughly attached to the pack. Packs of this character, which have already been under the notice of the committee, are such as can be thoroughly recommended, and the extra cost of such a paper lining is estimated not to exceed 9d. per bale

Cape Fruit Export.

REVIEW OF THE 1909 SEASON.

WE have received a copy of a report of the Trades Commissioner for Cape Colony in London on the fresh fruit export trade, for the season 1909, which has been submitted to the Under Secretary for Agriculture, Cape-town. As the report will doubtless interest a wide circle of our readers we propose to publish it *in extenso*, in instalments. The report (which is dated 29th October) runs as follows:—

Sir,—I have the honour to report that during the past season I gave my earnest and unremitting attention to the export trade in fresh fruit from the Cape Colony.

Under the headings of the different varieties of fruit I deal in this report with the results of the season under review, the prices obtained, the condition in which the fruit arrived, the quantities exported, and the quantities of each class of fruit which could be disposed of on these markets without seriously affecting the prices, the varieties, or classes, the qualities and sizes of fruit which are most desired, and those which are not wanted on these markets. I have also dealt fully with the questions of packing, grading and transportation of the different fruit, and I trust that growers and shippers will take serious note of these remarks and recommendations. I cannot too earnestly impress upon them the futility of shipping such varieties, qualities and sizes of fruit as the market does not want; they should exercise the utmost care in the packing, grading and selection of their fruit. It is essential that the requirements, the likes and prejudices of the buyers on these markets should be carefully studied, however peculiar they may appear to those who live under different conditions and in a different climate. It is also equally important that the peculiarities of the fruit itself should be carefully studied in so far as its capacity for keeping and travelling is concerned.

Fruit gathered in the heat of the day, or exposed unnecessarily to the heat after being gathered, or carelessly handled, or over-ripe when gathered, will not arrive in a saleable condition on this side. To disregard these points, or even to look upon them lightly, will mean certain loss to the actual shippers, and harm done to the name of Cape fruit from which all exporters will suffer.

During the past season the fruit arrived in a better condition; there has been a marked improvement in the manner of packing, and new methods have been experimented with, some of which are likely to prove successful and will probably improve the condition of the fruit on arrival. Unfortunately, however, the resources of the consignees and salesmen for

the disposal of Cape fruit were severely taxed; the unusual and almost unprecedented bad weather created a state of affairs with which they never before had to contend since the Cape fruit trade was started. Besides continuous fogs and rains, the weather was bitterly cold; sometimes for four or five weeks the temperature seldom rose above freezing point, and almost throughout the Cape fruit season greater portions of the United Kingdom and the Continent were covered with snow. Not only did people feel disinclined to eat fruit, but they were prevented from moving about and doing their shopping under such unfavourable conditions.

QUANTITIES EXPORTED.

The following figures show—in boxes—the total quantities of fruit exported from the Cape Colony for the seven years ending 1905:—

1899	10,817	1902	14,998
1900	17,336	1903	21,968
1901	17,265	1904	34,723
1905	23,832		

and for purposes of closer comparison I append the quantities of each variety of fruit exported during the past four years:—

	1906	1907	1908	1909
Peaches	7,612	10,572	12,925	17,298
Pears	19,025	22,213	51,614	55,129
Plums	15,583	23,160	15,047	32,184
Nectarines	1,151	1,149	762	2,191
Grapes	15,491	23,291	77,367	32,323
Melons	—	—	1,494	216
Apricots	868	1,214	10,486	2,164
Apples	41	213	450	201
Pines	70	494	2,440	32,095
Sundries	25	49	153	121
	59,866	82,355	172,738	173,922

In reviewing these figures it is gratifying to notice a gradual increase in peaches and pears, and a substantial increase in plums and nectarines. There was a considerable decrease in 1909 in the quantity of grapes as compared with the previous year, and this is probably due to the unsatisfactory prices obtained during 1908. As prices obtained during the past season were again satisfactory, the quantities to be exported during the coming season will probably be considerable. I am not sorry to record a very considerable decrease in the quantity of apricots as compared with last year's exports, which were excessive, but I would welcome a gradual increase on the quantities during 1909. The enormous increase in the quantity of pines was rather embarrassing to those on this side who had to

dispose of them; I deal, however, with this feature under the heading of "Pines." It is very desirable that increases in the export of each class of fruit should be gradual, but this can only come about when there is co-operation amongst shippers.

COST OF EXPORTING.

From actual experience and from other sources of information at my disposal, I have made estimates of the total costs of exporting different varieties of fruit, and I think these figures will be useful to those growers who have not yet had much experience in the export of fruit.

In submitting these figures I feel that I am laying myself open to criticism by experienced exporters, but I must explain that during the past three years I have kept accurate records and made many estimates, and although my present figures are the outcome of previous estimates, they may not agree with the experience of many individual shippers, but they will probably prove to be a fair average of the result of the bulk of the shipments.

I have also added a column showing what I consider the *average* prices realised, for fairly sound and average quality fruit, during the past three years.

Wasty or rotten fruit realised little or no price, while very excellent fruit sometimes make fancy prices.

Estimated Cost of Packing, Shipping, and Selling Fresh Fruit from the Cape Colony on the London Market.

	Cost of Boxes or Crates	Cost of Labour in Packing, &c	Paper, Wood, Wool and Nails	Railage and Dock Charges	Ocean Freight	London Charges	Total Cost	Estimated Average Prices
FRUIT SHIPPED IN COLD STORAGE.								
Nectarines & Peaches, 20 to 24	s. d. 0 3	s. d. 0 3	s. d. 0 2	s. d. 0 1½	s. d. 0 9½	s. d. 0 8	s. d. 2 3	s. d. 17 6N
Pears, 28 to 36 ...	0 3½	0 3	0 2½	0 2½	1 1½	0 5	2 6	4 6
Plums, 24 to 36 ...	0 3	0 2	0 2	0 1½	0 8½	0 5	1 10	4 9
Grapes, in 20lb. boxes	0 7½	0 4½	0 4	0 3	2 4	0 11	4 10	8 6
Grapes, in 10lb. boxes	0 4	0 2½	0 2	0 2	1 2	0 6½	2 7	4 7
Grapes, in 40lb. crates with baskets ...	2 7	1 0	0 3	0 8	4 0	2 0	10 6	20 0
Apricots, 28 to 36	0 2½	0 2	0 2	0 1	0 5	0 2½	1 3	5 0
Apples, per bushel	0 9	0 4	0 2½	0 3½	2 0	0 6	4 1	7 0
FRUIT SHIPPED IN VENTILATED HOLD.								
Oranges, per 100	0 10	0 3	0 3	0 5	0 1	0 7	3 3	6 3
Naartjes, 25 to 32	0 3	0 2	0 1½	0 2	0 3½	0 3	1 3	2 6
Pines (Queens), 1 doz.	0 9	0 1½	0 2	0 3	0 8½	0 4	2 4	3 4
Almeria Grapes, 30lbs.	0 9	0 3	0 6	0 4	1 3	0 8	3 9	8 9

FINANCIAL RESULT OF THE 1909 SEASON.

For the information of those interested in this trade, I have made the following estimates of the financial result of the fruit exported during the past season, calculated on the basis of the foregoing estimate of the "cost of shipping and average prices realised." These figures do not include oranges or other citrus fruit, nor fruit shipped from other South African Colonies.

Estimated total amount realised by sales ..	£41,376
Estimated cost of boxes and packing material (all imported)	£4,996
Railway and dock charges	1,649
Ocean freights	8,596
London and other market charges	4,052
Estimated total outlay, not including labour in packing and cost of production ..	19,293
Estimated net profit on sales	£22,083

From these figures it will be seen that shippers have to incur an outlay of nearly 50 per cent. of the return they may fairly hope for before they are in receipt of any remittances from their agents. It will also be seen that the ocean freights are estimated to amount to more than 20 per cent. of the total amount realised.

Although the figures showing the gross financial result of the past season are not imposing, and do not convey the idea that a large export trade worthy of the name has been created, I desire to point out that this trade is increasing as fast as is compatible with the requirements and expansions of the markets. The packing and the quality of the fruit exported are improving, and more economical and expeditious methods are being adopted in the matter of exportation. While it is profitable to ship the classes of fruit which make up almost the entire bulk of the fruit now exported from the Cape Colony, it must be remembered that these are high-class fruits, and as such will always only command a limited market, as they can be bought only by well-to-do people. They are, moreover, costly to handle and more or less delicate and risky to trade in. Growers should therefore seriously commence to direct their attention to the fruits which can be shipped cheaply and in large quantities without greatly affecting the markets, and which will be consumed by the masses. I refer to such fruits as apples, Almeria grapes and oranges, and to the list might also be added pears and pines, of which fairly large quantities are already coming forward. The two last-mentioned fruits cannot altogether properly be classed with cheap, popular fruits, but there is no reason why they should not become so.

I am dealing with apples and Almeria grapes fully in this report, and with oranges in a later and separate report. I must, however, impress upon growers of fruit the fact that if a large export trade is to be created, it will have to be with the aid of the fruits just mentioned. If the quantity of Almeria grapes or apples shipped to these markets during one season exceeded in each case the total quantity of all fruit at present exported from the Cape Colony, it would not affect market prices as much as the increased shipments of plums did during the past season.

DISTRIBUTION AND MARKETS.

The methods adopted by the consignees of Cape fruit for its distribution through the different markets of the United Kingdom and the Continent of Europe have much improved during the past year. The consignees have realised the importance of distributing the fruit sent to them in the widest manner possible.

Covent Garden is, of course, the greatest market in England, though I am not sure that it deals with the largest bulk of fruit, but it is certainly the market specially suited for the distribution of the varieties of fruit exported from the Cape and dealt with in this report. It is the best market for high class fruit, and is attended by buyers from all parts of the United Kingdom.

Notwithstanding the advantages which Covent Garden affords, and the position it holds amongst the fruit markets of England, I consider it to be very desirable that certain classes of fruit which are intended for the provincial and Continental markets should be forwarded direct from Southampton, when carried by the mail steamers.

A few years ago I induced a firm of commission agents at Southampton to take up the distribution of fruit direct from that port. The results of their efforts have been quite successful, and the prices returned by them compare most favourably with those of Covent Garden.

The advantages derived from this method of distribution are, that the fruit is forwarded to the different provincial markets on Saturday morning, immediately after being landed, and arrives at its destination on Monday morning simultaneously with the bulk of the consignments at Covent Garden, thus not only saving time, but a considerable amount of handling also. I have found that fruit, and more particularly grapes, first forwarded to London and removed to the depots of the fruit agents there, and then purchased by the provincial buyers, suffers a deal of damage by the extra amount of handling.

While expressing the firm belief that Covent Garden is the market for the large bulk of the Cape fruit, I consider it advantageous and cheaper to forward the fruit intended for other markets direct from Southampton.

The methods of distribution depend largely upon the shippers them-

selves, as they select the class of agent to whom they prefer to consign their fruit. Cape fruit is handled by three distinct classes of consignees, whom I will describe as follows:—

(a) *The General Agent*, who is probably a merchant or commission agent dealing in all classes of merchandise or produce. He is not in the fruit trade, but his functions are to place the fruit consigned to him in the hands of a fruit salesman or fruit auctioneer; to use his discretion as to the markets in which he considers it most advisable to place the fruit; and, if necessary, to hold back the fruit if he considers the market unfavourable. It is also his duty to keep a close watch on the salesman or auctioneer entrusted with the disposal of the fruit, and to endeavour to obtain the best prices possible for the shipper. In some cases these agents split up their consignments amongst a large number of fruit salesmen in different markets, and frequently change the salesmen if they are not satisfied with the prices. These agents are also liable for the proceeds and take all responsibility for which of course they receive a commission, which is arranged beforehand.

(b) *The Fruit Salesman* is in the fruit trade and deals in nothing else. He has stalls in Covent Garden and depots in the immediate neighbourhood. He is in direct touch with the fruit buyers and fruiterers, and is the real means of distribution. Fair quantities of Cape fruit are shipped to these salesmen on consignment to be sold on commission. They claim to be in a better position than the fruit auctioneers to obtain high prices, as they have more time to sell the fruit, which they do by treaty and by bargaining. This method of selling is said to be particularly advantageous with high-class fruit, and especially fruit which is not very well known on the markets.

(c) *The Fruit Auctioneers*. These firms occupy stands in the Floral Hall of Covent Garden, where large quantities of fruit are sold three times a week by public auction. Samples of the brands are exposed on tables previous to the sale, and while the sale is proceeding two boxes of each brand are opened in the presence of the large audience of buyers and bidding is immediately started. Though there are some drawbacks to this method of selling, yet it has considerable advantages. The fruit thus sold is immediately taken off the market and disposed of by the retailers. The fruit auctioneers contend that they make better prices than other salesmen, and in some cases I have found them to be correct in this statement.

It is also feasible for shippers to consign their fruit direct to the auctioneers should they consider it advisable to do so. I consider the public auction method of selling to be advantageous when large quantities of fruit are coming forward.

But as to the best manner of disposing of the fruit on these markets, I would advise shippers to select a good agent with some experience in the Cape fruit trade, and leave it to his judgment as to its disposal. A

great rivalry has been created amongst the consignees of Cape fruit, each of whom is doing his best to satisfy his patrons, and on the whole I think everything possible is being done by these gentlemen on behalf of the shippers to obtain the best results.

The development and exploitation of provincial and Continental markets is a question which has received my close attention.

I have been in constant communication with the principal dealers in the large provincial towns in the United Kingdom, and have endeavoured to place them in direct communication with the consignees in London and at Southampton who have large quantities of fruit for distribution.

In regard to the Continental markets I may mention that I visited Hamburg and found that this port could be gradually developed as a market for the different varieties of Cape fruits. The large towns in Germany are mostly supplied through Hamburg.

Rotterdam and Amsterdam are also taking small quantities of Cape fruit, and there is every reason to believe that these markets will also gradually develop.

The market in Paris for Cape fruit has always been a difficult question, but I think it will, in time, also develop.

I have recently been in communication with the principal fruit dealers at Copenhagen and Stockholm, with a view of opening up markets for Cape fruit and I am led to believe that small quantities will find their way there during the forthcoming season.

With reference to Continental markets generally, it must be borne in mind that Cape fruit is quite new to them, and that such classes of fruit which arrive during the winter months are a novelty and will, at the outset, only meet with a limited demand.

I should also like to point out that there are at present considerable difficulties in transporting the fruit to the Continental markets, upon arrival at English ports. Different consignees have adopted different methods, but none of these methods are quite satisfactory. The quickest route which has now been found for despatching consignments intended for the markets of Northern Europe is to ship *via* Grimsby to Hamburg. For this purpose the fruit should be put on rail at Southampton, on Saturday morning, and forwarded direct to Grimsby by the South Western and Great Eastern Railways. The first available boat sails from Grimsby on the following Monday evening. The fruit could thus be placed on the Hamburg market on Wednesday. By the other routes which have hitherto been made use of, the fruit arrived at Hamburg on Friday and could not be marketed until Saturday morning, which is not a good market day. These are questions, however, which would be best left in the hands of the consignee, with whom I am in constant communication upon the subject.

As to the question of developing a market for Cape fruit in New York, the same remarks would apply as to other new markets. I think a

market could be developed there, but it must be done gradually, while studying the tastes of the people, and gradually making them accustomed to these classes of fruit during the winter months.

GOVERNMENT BRAND.

During the past season I have again carefully noted the effect of the Government brand on these markets, and I regret to have to repeat that little notice was taken of it by fruit dealers. This is much to be regretted, as it would undoubtedly be of great advantage to those shippers who pack first-class fruit if the brand was recognised in the trade. The fact, however, remains that after the brand has been placed on the box certain classes of fruit deteriorate in different degrees, and the fruit is judged on this side solely by its condition on arrival. I think, however, the branding of the fruit has had a good effect upon the general quality of the fruit shipped as the Government inspection would act to a certain degree as a check on those shippers who, through lack of knowledge, contemplate the shipment of fruit which would be unsuitable for this market. The Inspector is also in the position to see that the boxes are properly marked, and generally to advise shippers upon any mistakes which might have been made by their employees unknown to them.

If I were a shipper of fruit, and satisfied that the Government Inspector was thoroughly conversant with the latest requirements of the London market, I would give him full authority to reject any portion of my fruit intended for shipment, if he considered it unfit for export, in which case it could be sold for what it would fetch on the Capetown market. There is not the slightest use in paying freight on fruit which could not stand the journey, or which is of such quality or variety as to make it unsaleable on these markets.

ADVERTISING CAPE FRUITS

I notice that this question has been raised recently on more than one occasion, and in connection therewith I would like to state that I consider it highly desirable that some steps should be taken to make Cape fruit better known on the markets of the United Kingdom, as well as those of the Continent. The fact that the fruit is not well known even to the fruiters considerably restricts the demand.

It has been suggested to me that an attractive coloured bill poster, illustrating Cape fruit, should be prominently exhibited at all towns where Cape fruit is sold, and I think if this could be done it would certainly benefit the trade.

The question is, however, who is to pay for such advertising, and upon this point I prefer to make no suggestion.

Another method of popularising the fruit is by taking advantage during the season of the horticultural shows held at different parts in

England. If shippers were to instruct their agents to make use of these shows and to exhibit samples of their consignments (which might be packed specially for this purpose), they would, in addition to the probability of their winning prizes, be greatly benefitting the trade and have the satisfaction of knowing that they are doing so by the method of self-help.

During March, 1908, the Royal Horticultural Society very kindly allotted a day specially for South African fruit, and offered several valuable prizes. They placed their hall and all their attendants at my disposal free of charge. Although I gave ample notice of this generous offer to the fruit-growers in the Cape Colony through your Department, the result was most disappointing, for only two shippers took advantage of the Show, and I would have been left entirely in the lurch had it not been for some of the agents of the growers who, at my special request, came to my assistance and put up some very creditable exhibits. In spite of this I had, however, to purchase a quantity of Cape fruit at my own expense so as to make a fairly representative show.

(To be continued.)

DESTRUCTION OF RATS IN CANE FIELDS.—The following plan has been adopted with success:—As soon as the crop was off (as nothing can be done amongst full-grown cane) great slaughter was caused by laying baits of ripe cane; the cane being split into two or more pieces, 6 in. long, and saturated by dipping in a 2 per cent. solution of strychnine. As long as there was little new cane to be got, these baits proved an irresistible attraction to the rats; after the cane was up the rats were not so keen, and a new medium of bait had to be tried. The following was the most successful:—Green sweet potatoes sliced up into small pieces (the small tubers were mostly used), allowed to dry for twenty-four hours, and then, as with the cane bait, dipped in a 2 per cent. solution of strychnine. These were freely taken by the rats, of which large numbers were destroyed. Another simple plan, said to be very effective, is worthy of trial: Dress plenty of bits of straw with strong birdlime, and spread these thickly on the ground around the burrows. Amongst the straws throw some attractive bait—barley or malt sprinkled with oil of carraway is a good draw. Next morning the straws will be found gathered up in little bundles, and in the centre of each will be found a rat, dead or alive.—*Journal of the Jamaica Agricultural Society.*

The Tanning Industry.

WHAT THE O.R.C. PROPOSES TO DO.

THE COMMISSION'S REPORT.

THE Commission which was appointed last year by the O.R.C. Government to inquire into and report upon the state of the tanning and tobacco industries of that Colony have now submitted their report, which has been published by the authorities. The section of the report devoted to the tanning industry is of more particular interest at the present time; and we accordingly propose to reproduce the leading features of that portion of the document.

The Commission, in considering this important industry, decided to investigate and report upon the following:—(1) The condition of existing tanneries; (2) the available supply of tanning material in the Orange River Colony; (3) the supply of hides and skins of good quality; (4) the most suitable place or places for the establishment of tanneries; (5) boot factories in connection with tanneries; (6) the payability and commercial success of ventures of this kind; and (7) the form of Government assistance to encourage the establishment of tanneries and the training of young men to the trade.

There being no established tanneries in the Orange River Colony, the Commission visited Potchefstroom, where they were informed that the Government Industrial School and Orphanage included a tannery.

Some boys are being taught the trade of tanning in a small establishment, under the supervision and direction of a Mr. de Jong, a thoroughly qualified tanner, and the leather prepared there is either used in the small bootmaker's shop connected with the school or sold.

The Commission are convinced that the tanning material known as Eland's boontje is available in this Colony in practically unlimited quantities. According to the evidence of Mr. de Jong, this root, when mixed in proper proportions with other barks and roots, makes a very suitable tanning material. At this institution at Potchefstroom Eland's boontje is being bought at 4s. per 100 lbs. in the dried and broken-up state.

From the results of this small institution, as well as another of an even smaller nature carried on by one man near Parys, without assistance, and which the Commission also had the opportunity of visiting, it appears that tanning can be carried on quite profitably in a small way by individual effort and with very little capital.

The Commission also visited the Kingwilliamstown Tannery and Boot Factory, where the industry is carried on on a very much larger

scale and on up-to-date lines. This establishment deals with about 300 hides and skins per week, which are treated in a very creditable manner, suitable machinery being used for finishing off and splitting the leather. The hides used in this tannery are mostly from the Orange River Colony and Transvaal, and are stated to be of very good quality. The manufactured leather is either sold or made into boots in the workshops connected with the tannery, where only the ordinary Veldschoen and Blucher for children and men are turned out, and which find a ready sale in this Colony.

When it is realised, the Report remarks, that the Veldschoen originated in this country, and that it is not used in any other country in the world, and that the imports of these articles are very common imitations of the original South African production, it must be admitted that a legitimate industry was filched away for a number of years, and one well adapted to employ and give a livelihood to our youth.

Mostly white labour is employed in the boot-making on the piece system, which appears to be considered the best. In the tanning yards natives are employed to do most of the work, but there seems to be no reason why white labour should not be substituted entirely.

The Commission was led to the conclusion that this establishment, which may be considered as typical of many others in the Cape Colony, is in a very prosperous condition, and it may be assumed that there is every possibility of establishing flourishing concerns of a like nature in the O.R.C., especially considering the enormous saving that would be effected in railage on the raw hides coastwards and on the manufactured article back again. Considerable capital is, however, required in a business of this kind.

The Chairman of the Commission also visited the Liesbeek Tannery at Rondebosch of Messrs. Mossoy & Sons, Ltd., on the 3rd of September. The manager of this establishment placed in the hands of the Commission a statement dealing with the position of the tanning industry in general, and especially pointing out the existing disadvantages owing to the uncertainty of the Customs tariffs and the inadequate protection in the past.

The Commission took exhaustive evidence from Dr. Targett Adams with reference to the various materials procurable in South Africa, and especially in the Orange River Colony. It would appear that while the percentage of tannin in the Eland's boontje is very satisfactory, sufficient trials have hitherto not been made to prove conclusively that it could be used extensively and to advantage, both from the point of view of cheapness and the quality and colour of the leather produced.

The Kingwilliamstown tannery uses almost exclusively wattle bark grown in that district, and costing, delivered there, as much as nearly £8 per ton.

Until the tanning value of Eland's boontje commercially has been fully determined any expression of opinion on the part of the Commission, the Report remarks, must needs be premature and perhaps unreliable, but there seems to be no reason to doubt its suitability, and it can reasonably be assumed that it would pay any farmer to dig the root and bring it to market, judging from the price at present being paid for it at Potchefstroom.

According to the evidence of Dr. Targett Adams, the percentage of tannin in Eland's boontje is about 21 per cent., as compared with 50 per cent. in wattle, and this would seem to justify the conclusion that, considering the market value of wattle bark, Eland's boontje could be profitably used.

The hides and skins to be treated in a tannery, the Report goes on to say, should always be of the best obtainable quality. Hides of animals in a low condition, or of an indifferent quality, or badly skinned and partly damaged through being too heavily branded, are very unprofitable to the tanner, and the same would apply to sun-dried hides. It has been ascertained beyond doubt that the best results are obtainable if the tanner can procure hides fresh from the butcher and forthwith apply his own treatment. The most suitable place for establishing a tannery should therefore offer the following facilities:—

- (1) Central situation, with railway connection to tannery.
- (2) Suitable water supply.
- (3) Ample supply of fresh hides and skins.
- (4) Cheap motive power.
- (5) Opportunities for disposing of refuse.
- (6) Sufficient supply of white labour.
- (7) Convenient and ready market for the manufactured article.

Taking all these requirements into consideration, the Commission are of opinion that Bloemfontein would be the most suitable place for establishing a tannery as contemplated.

The Town Council of Bloemfontein are prepared to offer the Government, on favourable terms, a suitable site near the Abattoir, and connected with the sewerage system of the town, as well as a sufficient supply of water and electric power at special rates. The Commission also had Kroonstad under consideration for the establishment of a tannery, but found that, although suitable in some respects, all the necessary facilities are not available there.

From what the Commission saw in Kingwilliamstown they have no hesitation in recommending a boot factory in connection with the tannery. Such a factory, producing, as it would, only the ordinary boot for farm and native trade, requires no expensive machinery, and the work is so simple that inexperienced workmen soon become trained hands.

In the tannery young men of the country would be taught the trade, and many would be found who would gradually establish themselves in a small way in convenient centres, thereby earning their own living and becoming the means of furnishing employment for the others, while in the boot factory scores of young people could learn the work and find ready employment.

Although the commercial success of such a venture may be considered pretty well assured, there has been no initiative in this direction by those interested in this particular industry owing, amongst other reasons, to:—(a) The amount of capital required to be invested in building and machinery and in the necessary supply of skins, hides, and prepared leather; and (b) the uncertainty of the Customs tariffs and the insufficient protection to the industry in the past.

The Commission being convinced that the establishment of such an industry would materially benefit the Colony, have recommended to the Government the following:—

- (1) The Government to call for applications from parties willing to undertake the establishment and management of a tannery or tanneries in this Colony.
- (2) The Government to acquire the ground and erect the necessary buildings and machinery in consultation with the applicant, also procuring the necessary facilities as regards water, motive power, etc., and to let the factory under the following conditions:—
 - (a) Nominal rent to be charged for first three years.
 - (b) Thereafter rental equal to moderate interest on capital expended.
 - (c) Applicant to furnish guarantee of sufficient working capital.
 - (d) Only white labour to be employed.
 - (e) Twenty-five per cent. of the number of hands employed to be apprentices to the trade, applicants for such apprenticeships to be recommended by Government, under conditions to be agreed upon.
 - (f) Applicant to undertake to give tanning materials obtainable in the O.R.C. a fair trial.
 - (g) Applicant to have the right after a stated period to buy the factory from the Government at a price not exceeding the capital outlay less reasonable reduction for depreciation of machinery and appliances.

Poor hay and straw will make good material for bedding.

The Wool Market in 1909.

WE have received through the Agent-General for Natal in London a copy of Messrs. Buxton, Ronald & Co.'s Annual Colonial Wool Report for the period October, 1908, to October, 1909, which contains some interesting information regarding the market during the past year. Reviewing each series of wool sales in turn, Messrs. Buxton, Ronald & Co. remark that the first series of the year commenced under favourable circumstances. Actual results, however, showed that the United States for the moment were less keen on greasy merinos than they had been in December, and it was only the very best lots which maintained their position, other sorts falling away often as much as 10 per cent. Cross-breds, on the other hand, showed some slight advance for all grades. The tone at the close of the series was exceedingly strong, and a brisk demand was experienced during the interval before the March sales came on. Glowing accounts of the prosperous condition of practically all branches of the industry, both in England and elsewhere, were received, and from the activity in the combing and spinning departments, with no accumulation of stocks in manufacturers' hands, it was patent that things were indeed looking well. The position was further strengthened by the United States coming in as strong buyers again.

The March sales accordingly were awaited with confidence, and results came fully up to expectations. Greasy merinos, with the exception of the very best sorts, showed about 10 per cent. improvement, and scoureds all round moved up as well. Following these March sales an extremely strong and general demand set in. The position of the merino trade on the Continent was becoming stronger and stronger, and prospects for a further advance at the May sales became favourable. Values increased by from 5 to 10 per cent., but before the Whitsuntide holidays came on, a calmer feeling had settled down on the market. This resulted in many holders of low-priced direct importations unloading their stocks, which naturally gave the market a downward direction, with the result that dulness very soon came over the situation, the July sales commencing with but faint prospects of previous rates being maintained. Not long after the close of the July sales, however, a very general and persistent enquiry asserted itself, so much so that during August, when as a rule not much business is expected to develop, there was plenty doing, and heavy sales were put through. The September series opened with this enquiry undiminished; and merinos moved up from $7\frac{1}{2}$ to 15 per cent., fine cross-breds from 10 to 15 per cent., and medium and coarse grades about 15 per cent. Prices of merinos are now, Messrs. Buxton, Ronald & Co. state, about 25 per cent. higher than a year ago; fine quality cross-breds, about 25 per cent.; medium cross-breds, about 60 per cent.; and coarse cross-breds, about 40 per cent.

Messrs. Buxton, Ronald & Co.'s report also contains some useful information regarding South African wool on the English market which will doubtless be read with interest by sheep-farmers on the sub-continent. It states:—"The quantities offered on this market fall slightly short of last year's figures, namely, 44,868 bales, as against 49,348 bales. There was nothing very remarkable about the majority of the lots on offer; the general character, breed and get-up as usual left so much to be desired, that it is more than ever apparent that the best of what South Africa can produce does not find its way into the catalogues. That some growers, however, are aware that more progressive methods are imperative before South African wools can be fairly compared to Australian growth is clear from the fact that certain of the clips which have figured in the catalogues are really well graded and skirted, and all credit is due to these owners for their efforts to obtain for South African wools a proper place in the estimation of users.

"As we have pointed out on previous occasions, sheep farming in South Africa is no doubt hampered by disadvantages in the way of climate, disease and local conditions generally, which are happily absent in Australia, but there is surely no reason why these unavoidable circumstances should be aggravated by that complete disregard of the most elementary needs of the users which has unfortunately for long now characterised the marketing of South African wools, and which has been to such a large extent responsible for the discredit into which they have fallen. That a better reception is accorded to clips properly classed as to length and condition, and fairly skirted as to bellies and locks has been evident even to the most casual observer of the biddings in the sale-room. A far larger number of buyers have been interested, and with a continuance of up-to-date market preparation there are absolutely no reasons why this number should not be largely added to. In most cases, too, the prices realised have been such as to have amply compensated growers for their extra trouble, and to have given them encouragement for further efforts. With regard to the actual breeding of the sheep, it is satisfactory to hear that further large importations of good Australian stock have been made, and these, added to the undoubtedly good studs which are already in the country, should stamp South African wools in no uncertain fashion. It is to be hoped therefore that there will be gradually a weeding out of that large proportion of heavy, ill-conditioned, sappy fleeces which is met with to-day. Growers cannot be too often reminded of the fact that buyers pay according to the weight of clean wool they expect to get, and that these extra yolky, tippy fleeces are valued and paid for with a liberal margin to cover the loss occurring in the scouring.

"The Orange River Colony growers and Government are again to the front with their progressive methods, and in many cases classing and skirted have been carried out under supervision of a Government in-

spector. As this official's work has been found straightforward and satisfactory, his stamp already carries weight with buyers, and it is earnestly to be hoped that every care will be taken to prevent the possibility of any misapplication of the terms 'Sorted and classed under supervision of a Government Inspector.' On the whole, the season in the O.R.C. would appear to have been better than the preceding one, the wools being, practically without exception, better grown, although there was still often a break in the staple. Transvaals seem to have also experienced better times, and many of these clips showed good breeding and preparation. True Natal's were not much in evidence. Western District, Cape Colony, wools were a very fair sample. Karroos were rather finer than usual. The Midland clips were often deficient in length, but as a rule very well got up. Kaffrarians were mostly of good growth, the well-known choice clips being handsome specimens of bold, deep-stapled wools, but carrying a generous amount of nature. Rhodesian wools are not characterised as yet by great attractiveness, but they generally yield well, and will be better appreciated by buyers when larger quantities are grown."

The following are the prices ruling for South African wools during the period covered by Messrs Buxton, Ronald & Co.'s Wool Report (October, 1908, to October, 1909):—WESTERN CAPE: *November, 1908, Series:* Grease, 9½d to 10d; scoured, 20d to 20½d; fleece, 11d to 12d. *January, 1909, Series:* Grease, 9½d to 10d; scoured, 19½d to 20d; fleece, 11d to 12d. *March Series:* Grease, 9½d to 10d; scoured, 19½d to 20½d; fleece, 11½d to 12½d. *May Series:* Grease, 9½d to 10½d; scoured, 20½d to 21½d; fleece, 11½d to 12½d. *July Series:* Grease, 9½d to 10½d; scoured, 20½d to 21½d. *Sept. Series:* Grease, 10½d to 11½d; scoured, 21d to 22d.

ALGOA BAY.—*November, 1908, Series:* Grease, 8½d to 9½d; scoured, 18½d to 19½d. *January, 1909, Series:* Grease 8½d to 9d; scoured, 18d to 19d. *March Series:* Grease, 8½d to 9½d; scoured, 18½d to 19½d. *May Series:* Grease, 9d to 9½d; scoured, 19½d to 20½d. *July Series:* Grease, 8½d to 9½d; scoured, 19d to 20d. *September Series:* Grease, 9½d to 10½d; scoured, 19½d to 20½d.

EAST LONDON.—*November, 1908, Series:* Grease, 9d to 9½d; scoured, 16½d to 17½d; fleece, 8d to 9d. *January, 1909, Series:* Grease, 8½d to 9½d; scoured, 16d to 17d; fleece, 8d to 9d. *March Series:* Grease, 8½d to 9½d; scoured, 16½d to 17½d; fleece, 8½d to 9½d. *May Series:* Grease, 8½d to 9½d; scoured, 17½d to 18d; fleece, 8½d to 9½d. *July Series:* Grease, 8½d to 9½d; scoured, 17d to 18d; fleece, 8½d to 9½d. *September Series:* Grease, 9d to 10d; scoured, 18d to 19d; fleece, 9d to 10d.

NATAL.—*November, 1908, Series:* Grease, 7½d to 8d; scoured, 15½d to 16½d. *January, 1909, Series:* Grease, 7½d to 8d; scoured, 15½d to 16½d. *March Series:* Grease, 7½d to 8½d; fleece, 16d to 17d. *May Series:* Grease, 7½d to 8½d; scoured, 17½d to 18½d. *July Series:* Grease, 7d to 8d; scoured, 17d to 18d. *September Series:* 7½d to 8½d; scoured, 18d to 19d.

Agricultural Legislation.

ACTS PASSED DURING THE 1909 SESSION.

IN accordance with our usual custom, we propose to publish, as they are promulgated, the main provisions of all the Acts of interest to farmers passed by the Legislature during the present Session. The following are the Acts that have so far, up to the date of going to press, been promulgated in the *Gazette*:—

ACT No. 24, 1909,

*To amend Section 28 of the Land and Agricultural Loan Fund Act,
No. 27, 1907.*

1. The following proviso shall be added to Section 28 of the Land and Agricultural Loan Fund Act, No. 27, 1907:—

Provided that where an application is made for a loan for the purpose of paying off an existing bond an advance may be made of the amount due under such bond upon a cession of the bond to the Board pending the registration of a new bond in favour of the Board.

ACT No. 15, 1909.

*“To control the introduction into Natal and to regulate the disposal of
exotic animals and animal products.”*

1. No animal or animal product mentioned in the schedule to this Act shall be introduced into the Colony by sea or land save with the consent of the Minister of Agriculture previously obtained, and under such conditions as he may prescribe.

2. Any animal or thing which may be introduced into this Colony in contravention of this Act or the regulations which may be framed thereunder shall be confiscated and destroyed or disposed of as the Minister in charge of the Agricultural Department may direct.

3. Any person who may contravene any of the provisions of this Act or of the regulations which may be framed thereunder shall, on conviction in the Court of a Magistrate, be liable to a fine not exceeding one hundred pounds sterling, or, in default of payment, to imprisonment, with or without hard labour, for a term not exceeding six months or to both such fine and imprisonment, unless he shall prove to the satisfaction of the Court that the introduction was made by him unknowingly and with out negligence on his part. Offences under this Act shall be cognisable in the Courts of the Magistrates having jurisdiction.

4. Nothing in this Act shall be deemed to repeal the provisions of any Law or Act relative to any disease of animals.

5. This Act may be cited as "The Exotic Animals and Animal Products Act, 1909."

Schedule.

Bees and their larvæ, honey, beeswax (including foundation comb), honeycomb and other unmanufactured products of apiculture.

Such animals as are usually included among zoological specimens.

Act No. 33, 1909,

To regulate the export of elephant tusks and the horns, hides and skins of certain game.

1. No elephant tusk weighing less than eleven pounds shall be exported from the Colony. Any person exporting or attempting to export a tusk in contravention of this Act shall be liable on conviction before a Magistrate to a fine not exceeding £50 and the tusk shall, if found, be confiscated.

2. The horns, hides or skins of the animals mentioned in the schedule to this Act, and the tusks of elephants and hippopotami shall be subject upon export from the Colony to a duty of twenty per cent. of their value at the port of export.

Any person exporting or attempting to export any hides, skins, tusks or horns as aforesaid in contravention hereof shall be liable on conviction before a Magistrate to a fine not exceeding ten pounds sterling for every such article exported or attempted to be exported, or in default of payment thereof to imprisonment with or without hard labour for a period not exceeding three months unless such fine be sooner paid.

3. The export duties under this Act shall be paid to the Collector of Customs and the Customs laws and regulations applicable to the collection of import duties, seizure and forfeiture of articles liable to such duty, and all other matters incidental thereto shall, *mutatis mutandis*, and as far as may be practicable, apply to such export duties and articles liable thereto, subject to any special alterations which may be made by the regulations hereinafter provided for in order to adapt such laws and regulations to the purposes of this Act.

4. The Governor in Council may from time to time make regulations for giving effect to this Act.

Schedule.

Elephant, rhinoceros, hippopotamus, giraffe, or caméléopard, buffalo, eland, koodoo, hartebeest, bontebok, blesbok, gemsbok, rietbok, klipspringer, zebra, quagga, Burchell's zebra or any gnu or wildebeest of either variety.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

TURKEYS.

The unanimous testimony of the one hundred and seventy-seven turkey-growers who responded to the call of the *Farm and Home* for essays on turkey culture is that, to have success in raising turkeys, attention must be given to the care of the breeding of the stock. This must begin "the fall before."—HERBERT MYRICK (*Turkeys and How to Grow Them*).

SOIL TEMPERATURE.

The relation of soil to heat is largely dependant upon the relation of soil to moisture and the amount of moisture contained in the soil. It takes more heat to raise the temperature of a pound of water one degree than to raise the temperature of a pound of soil the same amount; so that the more moisture there is in the soil the more material there is to be heated, and this added material is more difficult to heat than the substance of the soil itself.—LUTE WILCOX (*Irrigation Farming*).

DRAINAGE.

It is rarely that a well drained soil can be injured by a copious supply of water; but one that is not drained may easily be turned into a quagmire by an excess of it. Drainage, therefore should be the first thing provided before this method of cultivation, let it be complete or partial only, is attempted. If the soil is not naturally drained by means of an open and porous subsoil of sand or gravel, tile drains should be laid in such a manner as to carry off the surplus water in the most effective manner.—HENRY STEWART (*Irrigation for the Farm, Garden, and Orchard*).

CREDIT AND SECURITY.

Our banking, as we have it, is essentially rich men's banking, and was advisably established to be such. It is quite true that bankers, made liberal by competition, to-day readily accept as customers comparatively small men with small balances and doing small business. But still, in the main, banking remains the wealthy man's special preserve. The explanation is simple. Credit presupposes security. It would not be legitimate without such. And there is—without co-operative banks—no security that the poor man can give which could at all satisfy bankers.—HENRY W. WOLFF (*Co-operative Banking*).

PREPARATION OF BRINE.

Many persons prefer to prepare the brine by adding to the salt some sugar, or molasses, and saltpetre, dissolving these in the water, and pouring the pickle over the packed meat. A very good recipe is as follows:—For 100 pounds of pork take 4 ounces saltpetre, 3 pints common molasses, or 2 pounds brown sugar, and 7 pounds clean salt: when thoroughly dissolved, pour over the meat, which it will cover, if properly packed. Many boil the pickle before using it, as the impurities from the salt, sugar, etc., will rise, and can be skimmed off: when this done the brine should be thoroughly cool before adding it to the meat.—F. D. COBURN (*“Swine Husbandry”*).

WATER SUPPLY.

The principal requirements of a gravitation scheme of water supply are as follows:—(1) That the spring or source of supply is situated at a sufficient elevation with regard to the place to be supplied, so as to produce a velocity in the pipes sufficient to deliver the quantity of water required. (2) That the intervening ground along the proposed line of pipes, between the source of supply and the district to be supplied, does not rise appreciably above the hydraulic mean of the system. (3) That the pipes are selected of such dimensions as will discharge the requisite quantity without necessitating a greater velocity than three feet per second. (4) That sufficient storage room is afforded, so as to allow for exceptional demands upon the supply, as well as for diminution in the latter in very dry seasons.—A. GREENWELL, A.M.I.C.E., F.G.S., Memb. San. Inst., and W. T. CURRY, A.M.I.C.E., F.G.S. (*Rural Water Supply*).

TO PREVENT PIGS ROOTING.

1st. Place salt and wood ashes in some considerable quantity, at certain places on the ground, so that the earth will become saturated with the salt and lye. It will be found that the hogs will frequent these spots and work out some holes, but thereby satisfying their root desires, and the sod will be left undisturbed. 2nd. Cut the rim of the snout with your pocket knife, slanting, as to the end and top of the nose, and leave both ends attached so that the rim will slip up and down when the hog attempts to root. This method, in my experience, is less liable to allow the rim growing fast again, than when the cutting is done by a “hog tamer” provided it is done correctly. 3rd. Put two rings in the snout. Buy common iron rings, such as are used by tinner, one inch in diameter, and when the rings are opened sufficiently, and the animal is secured with the usual cord loop on his nose, take a clip punch and make a hole on each side of the centre and in the rim of the snout, insert the rings, and force the ends straight.—A. C. MOORE.

Exchange Reviews.

WHAT OTHERS ARE DOING AND THINKING.

A SHORT article on the egg circles system which has been instituted in South Australia appears in the *South Australian Journal of Agriculture* for November. Twenty-one egg circles have now been established in this State; they represent a total membership of about 550, and the list of members is growing daily. These egg circles appear to be practically co-operative societies for the production and export of eggs. The South Australians realise that as individuals they cannot ship to England, and that if production is to be increased in that country the export trade must provide an outlet for their eggs. As a result these co-operative circles are being established throughout the State, so that every year exportation to oversea markets can be carried on by each circle taking its proportion of the export to England, and thus keeping up a satisfactory price locally, without resorting to the pickle tub.

It is the intention of the organising secretary of the egg circles branch to issue once a month to the members of egg circles a circular or small paper bearing on points connected with the poultry industry. The first paper has been published and sent to members, and it deals with the question of securing infertile eggs during the coming hot weather. The advice given is as follows:—The summer is about here, and unless you take steps to prevent it we shall begin to have the bad eggs coming in. With the system that is in operation we will not find nearly so many bad eggs as are found in the ordinary market article, but it is possible to so work the business as to have no bad eggs at all, even in the hottest weather. All that is necessary is to kill, sell off, or separate the roosters from the hens, and then the eggs will be infertile. Being infertile they will keep longer and are the best eggs for our purposes. As you all know, the circle business is being steadily built up on the foundations of size and superior quality. The graders at our depots will attend to size, but you members must see to the quality and freshness. Here are a few points:—(1) The roosters worry the hens; without them the hens will lay 10 per cent. better (2) The roosters eat the profits the hens make. (3) The roosters fertilise the eggs, causing them to germinate and quickly go bad in hot weather. It is believed that the sum of £50,000 is lost every year in South Australia through crude methods of handling, and running roosters with the hens. What is your share of this lot? (4) Miserable and weedy cockerels are allowed to breed and beget equally feeble progeny. Why not stop such bad business? (5) A strong rooster

will get up to 1,000 chicks in the year. Even on a big farm three or four roosters of this sort would be plenty. Six or eight of the best layers should be picked out for each cock and penned separately, and then the future stock would be all right, and the eggs from the other hens would be infertile. (6) The young cockerels should be sold off as soon as they are about five months old. After this age they will get chickens, and also eat the profits the hens make. The paper issued will fit the time of the year, and every point connected with poultry and egg production will be dealt with. By those means it is expected that the members will in a short time become educated with respect to the possibilities of poultry-keeping under intelligent management.

Chilled Shot for Boring.

The use of chilled shot as a medium for Artesian well-sinking is discussed by Mr. C. A. Scanlen late of the P.W.D. Water-boring Branch, in the December issue of the *Cape Agricultural Journal*. He points out that experiments in this particular line of boring have up to the present date proved not altogether satisfactory. The difficulties attending this medium are in fact more numerous than those in the way of diamond or percussion drilling; but the diamond method is so expensive that it is found advisable to find a cheaper though perhaps less convenient method. The writer considers that the method, whilst as a new invention it needs improving upon, nevertheless has a future before it, and its comparative cheapness will weigh largely in its favour.

Decay of Cabbage in Storage.

Investigations into the causes of the decay of cabbage in storage and into the means of preventing it have been undertaken by the United States Bureau of Plant Industry for the purpose of determining the factors contributing to the loss from decay which is annually experienced in America; and a bulletin has now been issued, from the pen of Mr. L. L. Harter, the Bureau's Assistant Pathologist for Cotton and Truck Disease Investigations, embodying the results of these investigations. It appears that soft-rot and leaf-blight are the immediate causes of decay, and that the organisms causing these decays gain access to the tissues of the leaves through wounds made by careless handling and also by following up the fibro-vascular bundles which have been previously killed by black-rot.

It is recommended that diseased or badly bruised cabbages should not be stored. The most important factors in the keeping of cabbage in storage are temperature and humidity. Water should not be allowed to accumulate in drops on the cabbage, and, if it does, immediate steps

should be taken to dry the cabbage, either by admitting air from the outside or by the use of stoves inside. Stoves should not be used, however, if it is possible to obtain the same results by using cold, dry, outside air. Houses should be opened and ventilated every day except when the air is damp and warm. Cold weather, when the temperature is at about the freezing point, is best for ventilation. The construction of houses, the methods of storing, etc., are important in so far as they contribute to the keeping of dry houses and the maintenance of a uniform temperature slightly above freezing.

Teff Grass.

In the *Agricultural Gazette of New South Wales* for November the results are published of trials which have been made at the various Government Experiment Farms in that State with brown and white teff grass (*Eragrostis abyssinica*). In 1907 seed of this grass was obtained for the purpose of trial. In the first trial both varieties did fairly well at Bathurst, Wagon, and Cowra, but the conditions were not satisfactory for a definite test. At the Hawkesbury Agricultural College both varieties were sown in 1907 in small experiment plots of the grass garden. The season was exceptionally dry and hot, but, notwithstanding this, a good stand was obtained. In powers of drought-resistance these teff grasses compare favourably with Rhodes grass. The brown teff attained a height from 18 to 24 inches, and seemed to be little affected by the hot weather. In this respect it stood out conspicuously among 100 other varieties of grass in the plots. It came on early in the season, and produced a good bulk of herbage. It forms a tufty growth, and stools out well from the centre. The stems are weak, and remain partly prostrate. Leaves are densely borne at the base, and extend well up the stems to the flowering head. The seed is produced freely, and is easily harvested.

White teff also grew well and rapidly. It reached a height of from 18 inches to 24 inches, but was not quite so vigorous as the other variety, and was slightly longer in reaching maturity. It did not stool so freely, and the leaves and stems were coarser and not so succulent. The stools are spreading, and many of the stems are almost prostrate. The seed-heads are pinkish or reddish in colour before the seeds ripen. Seed was produced freely.

A further trial was made in 1908, and in view of the interest which drought-resistance grasses have for the Natal stock farmer it will be as well to quote the opinion of Mr. A. H. E. McDonald, Experimentalist at the Hawkesbury College, on these two varieties of teff grasses. Mr. McDonald says:—Our experiments with these two varieties of teff

grass have been very successful. A fairly large area was sown on the 10th November, 1908, and although the weather was very dry for a considerable time after sowing both grasses maintained a healthy condition, and when the rains of February came grew very rapidly. A cutting of each kind made on the 2nd March, 1909, a little less than four months after sowing, gave the following yields of green food per acre:—White teff, 11 tons 18 cwts.; brown teff, 9 tons 6 cwts. There is no doubt that these are valuable, vigorous varieties. They seem to thrive well in poor sandy soil as well as in that of a more clayey nature, and to produce a large quantity of soft, succulent food. They remain green during the summer months, and make a second growth after cutting. They are annuals, but seed is produced very freely and germinates easily, so that when they are given an opportunity readily reseed themselves. They are likely to prove very valuable as a rotation crop, as they do not occupy the land a long time, and could be grown in many districts in the summer time to provide pasturage or to be used as hay, for which they seem to be very suitable. The results this year show that white teff is the heavier yielder. It is somewhat later than brown teff in maturing. In the dry weather the brown teff seemed to be more vigorous. White teff is taller and somewhat larger in the leaf and stem than brown teff. —

Trapping Caterpillars.

In order to mitigate the pest of caterpillars which is wreaking such havoc in defoliating the forests of Germany, a novel expedient has, according to *Chambers's Journal*, been adopted. The irresistible fascination of the candle-flame to the moth is well known, and entomologists are aware that street electric arc lamps afford a happy hunting-ground. The German authorities have turned this point to advantage. An electric light is erected on a suitable tower, beneath which is a deep, funnel-like vessel carrying powerful revolving exhaust-fans. These electric lights are fitted with powerful reflectors, which project the light in two well-defined rays upon the dark background of the forest, half a mile away, in much the same way as the beams of a searchlight. The result is described as remarkable. The hordes of brown moths that lay the eggs producing the caterpillars in such enormous quantities, dazzled by the light, come fluttering hastily towards its source. As they near the lamp they become caught in the vortex set up by the revolving fans, are sucked up, and swept through the funnel into a suitable receiver, subsequently being destroyed in the furnaces. So eminently successful was the first night's experience, when some three tons of moths were caught, that another similar installation is being erected. Though the defoliation of the trees may not be completely arrested, this wholesale destruction of the plague will certainly result in a heavy diminution in the ranks of the caterpillars, and the timber will be saved.

Home-Cured Bacon.

Mr. W. Smith, the pig expert of the Victorian Department of Agriculture, gives some useful hints on the home-curing of bacon in the *Journal of Agriculture, Victoria*. In killing the pig, he says, throw him on his right side by taking hold of the near or left fore-leg, still holding the leg with the left hand. Take the knife in the right hand, and cut the neck in a direct line with the chin, but not too near the shoulder. When making the cut always draw the knife after insertion back towards the chin; by doing so there will be less likelihood of shouldering. Two buckets of boiling water to one of cold makes a very good scald (140 degrees Fahr.). As soon as the hair will come off the ears clean them well. Then turn the pig over in the tub with back up, take all the hair from back and belly, leaving the head and feet until last. Clean the skin well in the hot water before putting cold water over the pig. Hang up as soon as possible, shave off all loose hairs, and scrub well with scrubbing brush. Open the pig down the belly and through the breast-bone, clean out the inside well, lift the flares or leaf lard while the carcass is hot, so as to let the latter cool properly. Leave the pig hanging in a cool place until the following morning.

The cutting up should be as follows:—If into sides, chop the pig down the backbone while hanging, then place each side on its back on a table, and remove the head. Take the breast-bone off with one rib, then saw the backbone off towards the ham, take the blade-bone out, and trim off all loose fat. Place the sides in a cool place; shake a little salt and saltpetre over them. Let them remain for three or four hours in order to drain, and then place the pork on a board or table slightly tilted, so that the drip will run into a dish. For every hundred pounds of pork, ten pounds of Black Horse coarse salt, three ounces saltpetre, two pounds brown sugar, three ounces allspice are used. Rub the ingredients well on the flesh side, placing one side on top of the other for twenty-four hours: then turn sides upside down, rub well on skin side, using liquor in dish, and leave them lying flesh downwards, the top side on the bottom. Repeat this treatment every morning for eight days, carefully saving the liquor, and pouring it over the pork as the salt is rubbed in. Then leave it for three days. Continue this process every third day for twenty-one days, and then brush the salt off and soak in cold water for sixteen hours. After this wash out in hot water and clean well, and hang up and dry with clean cloth. When thoroughly dry rub some olive oil on the outside skin, and smoke with kauri pine sawdust (dry) for twenty-four hours. If it is necessary to keep the bacon for any length of time, hang it up inside a freshly emptied flour sack securely tied at the neck. This will allow the bacon to mature and

keep it from the flies. The hams and shoulders can be cut off after the curing is complete.

Alcohol from Prickly Pear.

The question of making alcohol from tunas or prickly pear is discussed in Bulletin No. 72 of the New Mexico Agricultural Experimental Station. Quoting the American figures given in the Bulletin in order to furnish some idea of the financial side of the question, we find that a distillery with a capacity of 500 gallons of 90 per cent. alcohol in 24 hours costs about \$15,000. If the interest on the money invested and depreciation amounted to \$3,000 annually, the cost per gallon for alcohol from tunas would amount to ten cents, on investment and depreciation alone, when the plant is in operation only 60 days throughout the year. If other fruits or waste products of the farm could be utilised, and the working season prolonged, the cost per gallon would be less in proportion to the length of the season. The total cost for manufacturing alcohol from tunas would probably not exceed 15 cents per gallon. If 150 pounds of this fruit were necessary to produce one gallon of alcohol, only 16 2-3 cents would be left to pay for each 100 pounds of the tunas, and for profits to the manufacturer when the alcohol sold for 40 cents per gallon. If the manufacturer paid 15 cents per 100 pounds for the fruits he would, by fermenting 2,100 tons in 60 days, make a profit of \$100 above the 10 per cent. interest on the investment.

The Colour Sense of the Bee.

Mr. John H. Lovell gives the results, in the September number of *Gleanings in Bee Culture*, of some original investigations in connection with the study of the colour sense of the honey bee. Two transparent glass slides were taken, and underneath one was placed a strip of blue paper three inches long by one inch wide, whilst under the other was placed a piece of red paper of the same size. An equal quantity of honey was also placed upon the centre of each slide. A yellow Italian bee was accustomed by the experimenter to visit the blue slide, and after it had made a number of visits to this blue slide the red slide was placed six inches to the right of the other. When the bee returned from the hive it alighted on the blue slide, and a series of tests was made, by changing the relative positions of the two slides, in which it was found that in every case the bee favoured the blue one. The results of this experiment go to confirm Mr. Herman Muller's observations, as a result of which he found the blue was more agreeable to the bee than any other colour. Mr. Lovell is undertaking further experiments in connection with this question.

How to Transplant a Tree.

Writing in the *Philippine Agricultural Review*, Mr. Harold Cuzner gives some useful hints on how to transplant a tree. A tree should, he tells us, be transplanted at the period of its life when it is liable to receive the smallest possible injury. Trees that are very young may be dug up carefully and set up where desired; but if the trees are of large size they will stand moving much better if the roots are pruned several months before taking them up. This pruning can be accomplished by running a spade down on all sides of the tree. This being done, the trees should be left standing where they were growing, and the cut surfaces will heal over and put out a number of new small roots which can be preserved when the tree is dug up later on. If the trees are to be moved but a short distance they may be taken up with large balls of earth adhering to their roots to prevent their dying out.

Before planting, any bruised or injured roots should be cut off with a sharp knife so as to leave a clean smooth surface that will heal over quickly. The cut should be made so that the cut surface will be facing downward rather than to the side or upward. The hole should not be so small as to cramp the roots of the tree, and it should be deep enough to allow the tree to be set one or two inches lower than it originally grew. The soil should be well worked in about the roots and packed firm, but not hard. However, the top layer of soil, to a depth of two or three inches, should be left loose to act as a mulch and prevent the loss of water from the surface by evaporation.

EGG-EATING HENS.—To prevent hens eating eggs, provide dark nests for the hens to lay in, and discard all nests that are low down. It is often low nests that teach the hens the habit of egg-eating, because there the hens can see and eat broken eggs. Provide a few china nest eggs in a conspicuous manner for the hens to peck at; and this will soon convince them that there are other things in the world to eat besides eggs. Charcoal in boxes near the grit boxes will soon satisfy their appetite for mineral matter. You will find also that when egg-shells are supplied your egg yield will be increased. Most of the poultry supply dealers can furnish fresh crushed egg-shells. Give hens plenty of exercise, and they will not contract the habit of egg-eating nearly so quick. It is usually the idle hen that falls prey to such habits.—*Agricultural Gazette (London)*.

Reviews of Books.

GEOLOGY.

AN INTRODUCTION TO THE GEOLOGY OF CAPE COLONY. By A. W. Rogers, D.Sc., F.G.S., and A. L. du Toit, B.A., F.G.S., of the Geological Survey of Cape Colony. With a Chapter on the Fossil Reptiles of the Karroo Formation by Prof. R. Broom, M.D., B.Sc., C.M.Z.S., of Victoria College, Stellenbosch. With illustrations and coloured maps. Second Edition. London: Longmans, Green & Co., 39, Paternoster Row.

THE student of agricultural science—that wide field of scientific research which in South African conditions has remained up to the present comparatively unexplored—finds in the study of geology much that will assist him in his researches, particularly in connection with the soil: but the student of agricultural science is not alone in his appreciation of the value of the geological research work in the sub-continent: to be followers of other sciences also a knowledge of the geological structure of South Africa is necessary; whilst finally the general reader who is interested in scientific research in the sub-continent has also a tender regard for the results of the labours of our geologists. The “Introduction to the Geology of Cape Colony” has passed through one edition, and now appears in its second edition increased in value by extensive revisions in the light of the new information which has been made available as a result of the considerable advances which have been made in the study of Cape geology during the five years which have passed since the first edition of the book was prepared. The first edition of this book was written as one of the series designed by Dr. Muir, the Cape Superintendent of Education, to further the study of natural science; and the chief additions which are now apparent are in those parts of the work dealing with the ancient rocks of the north of the Colony, the Karroo system, and the rocks of the volcanic pipes related to the Kimberley group, while there are great advances to be noted in the palæontology of the Bokkeveld Karroo cretaceous formations.

The geological structure of the Cape Colony divides it into two parts, a northern region in which the strata have not been disturbed by earth-movements on a great scale since palæozoic times, and a much smaller southern region which has been the scene of mountain building and faulting during the mesozoic period. The transition zone between these two regions is curved; starting from the south-west, near the Cape Peninsula, it runs northwards around the north end of the Cederberg folds and turns south through the Tangua Karroo: in the country beyond Karroo Poort it takes an easterly course to the shores of the Indian Ocean, between the Gualana River and East London. The first of these two regions is essentially a country of plateaux, and though

it also forms the low-lying coast belt in the west of the Colony it can be conveniently called the Plateau Region; the second or Folded Belt is characterised by folds which have played a very important part in determining its existing surface features.

The authors first describe, after an interesting introduction, the Pre-Cape rocks of the south and west of the Colony, going through the Malmesbury series, the granites of other intrusive rocks, the Congo, French Hoek, and Ibiquas series, and Nieuwerust series; they then proceed to discuss the Pre-Cape rocks of the north of the Colony, comprising Kheis series, Kraaipan series, the Wilgenhout Drift series, the Granite and Gneiss, the Venterdorp, Transvaal and Matsap systems and the Zwart-Modder series; and the Cape system, comprising the Table Mountain series, the Bokkeveld series, the Witteberg series, and the Karroo system, which consists of the Dwyka, Ecca, Beaufort and Stormberg series. There is also a chapter on the Karroo dolerites and allied rocks and one on the reptiles of the Karroo system (which chapter is contributed by Professor R. Broom, M.D., B.Sc., C.M.Z.S., of Victoria College, Stellenbosch). The Cretaceous system, consisting of Uitenhage series, the Umzamba Beds, the Embotri Group, and the Noord's Camp Beds, next receives attention; and following this are chapters on the volcanic pipes younger than the Stormberg volcanoes, the Tertiary and recent deposits, whilst two chapters are devoted to a discussion of the Geological history of the Colony and the Economic Geology of the Colony.

The book is provided with a Geological map of the Cape Colony. The map comprises, besides the Cape Colony, the O.R.C., Natal and part of the Transvaal.

A DUTCH READER.

HET BOERELEVEN : Een Leesboek voor Zuid-Afrika. Door Alexander B. Lamont, M.A., B.Sc. Vertaald door M. J. Stucki. Met Vier Gekleurde Platen, en Honderd Een en Zestig Illustraties in de Tekst. London : Macmillan & Co., Ltd., St. Martin's Street. 1909.

In our September issue we noticed at some length a book which had been recently issued by Messrs. Macmillan & Co., Ltd., under the auspices of the Cape Education Department, entitled "A Rural Reader for South Africa." We have now received from the Superintendent of Education at Capetown a copy of a Dutch edition of the same little book which has just been issued. The translation is issued under the title of "Het Boereleven : Een Leesboek voor Zuid-Afrika." The translation has been performed by Mr. M. J. Stucki; and the book contains precisely the same matter and the same illustrations (including the coloured plates) as appeared in the English edition. A full notice regarding the book will be found in the Dutch edition of the *Journal*.

The Dutch edition is published, the same as the English, by Messrs. Macmillan & Co., Ltd., St. Martin's Street, London.

SOUTH AFRICAN POISONOUS PLANTS.

SOUTH AFRICAN POISONOUS PLANTS : Being Notes on South African Plants Poisonous to Stock, with particulars of Symptoms and Treatment. Illustrated with sixteen half-tone plates. By L. H. Walsh.

Poisonous plants have proved one of the serious obstacles which have confronted stock-farmers since the earliest days of the colonisation of this country. The early settlers, strangers in a new land, bought their information of the properties of plant and bush only at the price of bitter experience. The natives, notwithstanding their uncivilised state, possessed considerable knowledge of the toxic and therapeutic properties of many roots and herbs; but they were disinclined to part with their knowledge, and prized especially their craft with certain vegetable poisons. Gradually, however, the properties of the more potent toxic plants became known, though progress was slow; and even at the present day we are really far behind the times on this subject. Although most farmers soon discover if their stock are poisoned by certain plants, there are yet several maladies concerning which opinions are by no means unanimous.

Evidently there is a large field for research in this direction in South Africa, and it is a section of scientific investigation in the results of which the farmer is vitally interested. In fact, to make any advance in our knowledge on this subject, it is essential that the co-operation of the farmer be obtained, and help of very great value can be afforded by the farmer to investigations in this direction.

Mr. Walsh's pamphlet is a very useful beginning, describing as it does some twenty-five or more different plants known to possess poisonous properties, which have so far been located, and we hope to see it followed by revised editions adding gradually to the original list. Of the pamphlet itself it may be said that it is one which will prove valuable not only to the scientist but also to the stock-farmer. Every stock-farmer finds himself sooner or later face to face with cases of vegetable poisoning, and with such a pamphlet as this before him his task in ascertaining the precise cause of the poisoning and in treating the affected animal will be made a comparatively simple one. Starting with the symptoms, he is able to ascertain the name of the plant which caused the poisoning, and, in most cases, will find a photograph of the plant, and then he has before him the methods of treatment which have been found most efficacious. It is thus apparent that Mr. Walsh's pamphlet is one that will be of quite as much value to the farmer as to the scientist, and to both we can recommend it as opening a new field for research the results of which must eventually be of inestimable value to the stock industries of the sub-continent.

But we repeat that the botanist and the chemist can do little in furthering our knowledge of the poisonous plants of South Africa with-

out the aid of the farmer; and Mr. Walsh, in the introduction to his pamphlet, makes an appeal for assistance which we hope will be generously responded to by our farmers. What is required are specimens of any plants that may be thought poisonous to stock. These specimens (we repeat the directions Mr. Walsh gives) should be either packed in roomy receptacles, or sent flat between sheets of cardboard, and addressed to Mr. L. H. Walsh, P.O. Box 39, Capetown. If possible, the whole plant, root, stem, leaves, and flowers should be sent, together with a description of symptoms caused, and particulars as to the locality and growth of the plant.

The Position of East Coast Fever.

OUTBREAKS DURING DECEMBER AND JANUARY.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 18th December to 21st January:—

Dundee Division.—Outbreaks on the farms “Aletta” east of main line, north of Dundee-Vryheid line, “Mountain Top” east of main line, north of Dundee-Vryheid line, “St. Cuthbert” east of main line, north of Dundee-Vryheid line, “Landmeter’s Drie” east of main line, north of Dundee-Vryheid line.

Weenen Division.—Outbreaks on the farms “Mormoud,” “Thornhill.”

Umvoti Division.—Outbreaks on the farms “Urania” (sub-division of “Welgeluk”), “Hannahdale” (sub-division of “Umvoti Vlei”), “Kranskloof,” “Smith’s Hock” (sub-division of “Vogel’s Vlei” and “5½”), “Middledrift,” “Kinlock” (sub-division of “Mispah”), “Ashton” (sub-division of “Vogel’s Vlei”), “Mt. Allard,” “Keeron,” “Highfield” (sub-division of “Waterfall”), “Langvewlaete” (sub-division of “Summerfield”), “Spring Kloof” (sub-division of “Wonderboom”), “Wonderboom,” “Hartebeestefontein,” “Thorn Vale” (sub-division of “Success”), “Boschfontein,” “Arbitration” (sub-division of “Olivefontein”), “Oakford” (sub-division of “Twenty-one”), “Fair View” (sub-division of “Mispah”), “Woolstone” (sub-division of “Dreefontein”), “Hylton” (sub-division of “Nooitegedacht”), “Success” (sub-division of “Success and Petrus Vlei.”

Alexandra Division.—Outbreak on the farm “Kura.”

Klip River Division.—Outbreaks on the farms “Ngutu” (sub-division of “Klipfontein and Compensation”), west of main line, “Bronkhorst Vlei” (sub-division of “Klipfontein and Compensation”), west of main line, “Reserve,” west of main line, “Town Lands,” east of main line.

Lion’s River Division.—Outbreak on the farm “Mount Ashleigh” (sub-division of “Ashley”), west of main line.

New Hanover Division.—Outbreaks on the the farms “Newington” (sub-division of “Jepson’s Vlei”), “Blandsby” (sub-division of “Dalton”), “Ravensworth” (shown on map as 57a), “Bowthorpe” (sub-division of “Dalton”), “Mooiplats,” “Smidt” (shown on map as Lot 59), “Buccleuch” (shown on map as “Middle Hoek”), “Doorn Kop” (sub-division of “Doorn Kap”).

Campersdown Division.—Outbreaks on the farms “George Dale” (sub-division of “Woody Glen”), “The Recess” (sub-division of “Weltevreden”), “Sterling,” “Bergyleit.”

Richmond Division.—Outbreak on the farm “Spitzkop.”

Leopo Division.—Outbreak on the farm “Lot S 29.”

Estcourt Division.—Outbreaks on the farms “Stanger’s Hoek” (natives’ cattle), east of main line, “Clifton” (sub-division of “Craig”), west of main line, “Location No. 1,” west of main line, “Meltonleigh” (sub-division of “Craig”), west of main line, “Moorleigh” (sub-division of “Bergyleit”), west of main line, “Loch Sloy,” west of main line.

Bergville Division.—Outbreak on the farm “The Falls” (sub-division of “Zieve Laager”).

Umgenei Division.—Outbreaks on the farms “Reit Spruit,” “Fernside” (sub-division of “Hopewell”), “Braeburn,” “Rosemond” (sub-division of “Hopewell”).

Newcastle Division.—Outbreak on the farm “One Tree Hill,” west of main line.

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of the Victoria County, Umsinga, Vryheid, Ngotshe, Babanango, and Paulpietersburg.

In the opinion of some the quantity of water drunk by a cow is an important test of her value as a milker

Be sure that the cows have all the pure, clean water they can drink without walking long distances for it.

Correspondence.

Correspondence is invited on topics of interest to farmers. Letters should be written on one side of the paper only; and while a nom-de-plume may be used, all letters must be accompanied by the name and address of writer. The Editor is not responsible for the opinions of his correspondents: the letters which appear in these pages are published as the opinions of the respective writers, and their insertion does not necessarily imply editorial concurrence with the views expressed.

THE LABORATORY DIP.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Will you kindly tell us if it is possible to make the Laboratory dip in a concentrated form, say, 1 in 100 of water? This would be convenient to some of us who want to mix the dip just before washing.—Yours, etc.,

M. C.

[The Bacteriological Department has only devised the ingredients and the exact proportion in which such are to be combined, but has not gone further into the matter of preparation of this dip in a concentrated form.—Ed.]

AGRICULTURAL MOTORS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—The enclosed photos and cutting were taken by me from the *North British Agriculturist* some little time ago. I am sending them to you in the hope that, through publication in the *Agricultural Journal*, they may be of use to those readers who are searching for something to take the place of our poor old ox. If these photos are of no use to you, kindly return to me.—Yours, etc.,

T. B. TRAIN.

[Unfortunately the illustrations kindly forwarded by our correspondent are not sufficiently clear to admit of satisfactory reproduction in the pages of this journal. The cutting we have much pleasure in reproducing herewith. It is headed "The Marshall Oil Motor," and runs as follows:—Messrs. Marshall, Sons & Co., Gainsborough, have recently designed an oil motor which can be adapted to almost any kind of farm work, inasmuch as it can be used for ploughing, cultivating, hauling mowers and reapers, driving threshing machinery, etc. On Tuesday an exhibition of this motor working a four-furrow plough was held at Tur-

velaws, near Wooler, Northumberland, and proved an unqualified success. In the first place, the weather was very fine, and the widespread interest taken in the proceedings was indicated by a very large and representative attendance. Farmers and others living in places far distant from the scene gathered together. A commencement was made soon after ten o'clock, and from that time until close upon five in the afternoon the "Farmotor" plied up and down the field without interruption, excepting a brief dinner interval. Everybody was delighted with the motor and its work, and Mr. Richardson, the representative of Messrs. Richardson Bros., of Newcastle, who are the agents for Messrs. Marshall, Sons & Co., Ltd., Gainsborough, so far as Northumberland and Durham are concerned, received many hearty congratulations. The motor was not put to a very severe test. The lea field, which Mr. Cabry placed at the disposal of the firm responsible for the exhibition, was in first-class order for ploughing purposes. There was just sufficient mixture in the soil to give it a workable consistency. At the same time, it was firm enough to permit of the wheels of the machine passing over it without sinking more than an inch or two. Nor were there any hills or uneven parts to contend with, the enclosure being almost dead level throughout its extensive area. These advantages, however, do not put aside the fact that the motor did thoroughly good work. The quality of the ploughing was generally commented upon. The furrows were straight, and the depth remarkably even—being eight inches from end to end without a perceptible variation. A quadrangle machine plough was attached to the motor at the outset, and the ease and steadiness with which it bore that implement along suggested that some additional burden might be placed upon it. That was done by hitching on a single horse plough of the wheel type, the control of which was entrusted to a spare hand. Forming five furrows each journey, the motor went along quite as satisfactorily as before, and in the end the result was found to be similar to that which other experiments had given. Roughly speaking, about one acre per hour was actually ploughed in a manner which met with general approval. The day's work may be said, in fact, to have been an "eye-opener" to not a few of those present, who had evidently heard, with a certain amount of incredulity, reports of what the contrivance had previously done. If the claims set up on its behalf, so far as haulage is concerned, can be as easily substantiated there is a wonderful future for the motor as a means of traction in connection with ploughing. Nobody was more delighted with the operations than Mr. Cabry, the gentleman who lent the land. He spoke in emphatic words of praise of the "Farmotor." Another individual was heard to remark, "When we look at the wee thing it seems marvellous where the power comes from." Other trials at Inverness and Kelso are being arranged by the firm.]

THE FARMER BOYS' PAGES.

MONTHLY ARTICLES, NOTES AND PARAGRAPHS ON
ELEMENTARY AGRICULTURAL SUBJECTS

FOR

BEGINNERS IN AGRICULTURE AND STUDENTS GENERALLY.

Conducted by "ARATOR."

** * Correspondence, whether in the form of notes, comments, or inquiries, is invited from readers, and letters of general interest will be published and replied to in these pages. All communications should be addressed to "ARATOR," C.O. Editor, "Natal Agricultural Journal," Maritzburg.*

Agricultural Chemistry for Beginners.

By ARCHIBALD PEARCE.

CHAPTER V.

PHOSPHORUS AND THE PHOSPHATES.

THE subject of this chapter is one of considerable complexity, and some parts of it will need rather careful attention; but on account of the large part played by phosphates in the economy of both plant and animal life, and the many different forms in which they are found, it is often valuable to understand their constitution and peculiarities. Like nitrogen, phosphorus is not of great interest in its uncombined state; it is a yellow waxy solid, so inflammable that it has to be kept under water to prevent it catching fire spontaneously, and is chiefly used in the manufacture of matches. When it burns, which is, as we have learnt, only another way of saying when it combines with oxygen, it forms white clouds of phosphoric oxide, which is one of the acid-forming oxides, and is, therefore, sometimes called phosphoric anhydride. Making use of our previously gained knowledge of acids, we shall expect to find that this oxide combines with water to form an acid, and this is quite correct, for it rapidly dissolves in water, forming phosphoric acid. It would also be correct, following what has been said as to the formation of

salts, to conclude that if the hydrogen of the acid is replaced by a metal we shall get a phosphate of that metal. But just here the complexity arises, for phosphoric oxide, in forming the corresponding acid, combines with three portions of water, and so it contains hydrogen in three separate lots; and it is found that we can obtain three different phosphates, according as one, two, or three of the lots of hydrogen are replaced by the metal. As we shall be chiefly concerned with the phosphates of lime, which are more correctly known as the phosphates of calcium, since calcium is the true metal and lime only its oxide, we will draw up a table showing the constitution of these three phosphates of lime or calcium and the way they are connected with phosphoric acid. The acid may be represented thus:—

hydrogen	phosphorus
hydrogen	oxygen
hydrogen	

If one portion of the hydrogen be replaced by calcium the compound becomes:—

calcium	phosphorus
hydrogen	oxygen
hydrogen	

This salt is the mono-calcic phosphate—that is to say, one-lime phosphate—and in common language is called superphosphate or acid phosphate.

If two portions of hydrogen are replaced we get:—

calcium	phosphorus
calcium	oxygen
hydrogen	

and this is known as di-calcic phosphate—i.e., two-lime phosphate—and as reduced or reverted phosphate.

If the whole of the hydrogen is replaced there will be:—

calcium	phosphorus
calcium	oxygen
calcium	

which is the tri-calcic or three-lime phosphate, bone phosphate, or insoluble phosphate. For the purposes of these articles the correct chemical names will generally be used for the future, since the names themselves, if once understood, describe accurately which of the three forms is meant and prevent confusion.

TRI-CALCIC PHOSPHATE.

Of these three phosphates the tri-calcic must be considered the normal or natural form, since it is the one always formed when phosphoric acid and lime combine, providing, of course, that a sufficiency of the latter is present. It is found in bone, guanos, coprolites, and in

various parts of the world in the shape of phosphatic rocks such as apatite, which are all classed as mineral phosphates, some of them containing as much as 80 or 90 per cent. of phosphate. Tri-calcic phosphate is practically insoluble in pure water, but readily dissolved by acids. If we burn a bone in an open fire we shall find it converted into a white, brittle, and easily powdered mass, the animal matter having been burnt away, and though not pure phosphate may be used to study its characteristics. If a small portion be powdered and put into a glass with a little water it will refuse to dissolve, but when a little hydrochloric acid is added it will gradually dissolve to a nearly clear solution. Rain water, containing as it does some carbonic acid, slowly attacks and dissolves it, and the weak acids of plant roots have a similar power, the ease with which this solution takes place depending chiefly on the fineness of the powder. We all know that bone is an excellent manure, and it must, therefore, get dissolved somehow; but we also know it is necessary to grind it to a fine dust, and that the finer it is the quicker it acts. Most guanos are naturally composed of extremely fine particles, and the substance is in a soft condition, and so easily attacked by the roots of plants; but with mineral phosphates the case is different; many of them are nearly as hard as glass, and, although when finely—it must be very finely—ground they act slowly as a fertiliser, they are little used in this form, owing to this very slowness. Even in the case of bones it is often noticed that they exert a fuller effect in the second and third year than in the year of application.

BONES.

As bones are so popular a manure they are worth a little special notice. All plants contain more or less phosphate, especially in the seed, and thus animals obtain in their food the amount required to form their bony frame. Clean dry bone contains about 57 per cent. of tri-calcic phosphate, 37 per cent. of animal matter similar to gelatine, and a little chalk, magnesium phosphate, etc. Ordinary fresh bone contains a considerable proportion of moisture, and in a sample of bone-dust we may expect to find 7 or 8 per cent. This moisture and other unavoidable impurities reduce the percentage of phosphate somewhat, so that a good average sample of bone-dust should give about 20 per cent. of phosphoric oxide and 25 per cent. of lime. The animal matter contains nitrogen, and this gives a further manurial value; the amount is usually from $3\frac{1}{2}$ to 4 per cent. Sometimes bone is steamed before grinding; this removes a good deal of the animal matter with its contained nitrogen, but renders the bone more easy to grind; accordingly, steamed bone is a richer phosphatic fertiliser, but poorer in nitrogen, than raw bone. Bones are generally thought to give their best results on light soils, but even on clays they have proved a most useful manure. Various

plans have been proposed for hastening their action by rotting or fermenting them; one of the best is to mix raw bone with about a third of its weight of clay, moisten the mass with the urine of animals, and cover with a layer of moist clay two or three inches thick. The heap must be protected from rain. In a few weeks the solubility of the bone is so much increased that it has been known in some cases to give as good results as twice as much of the raw material. The following are the percentages of the chief ingredients in two samples of Colonial bone-dust analysed by the writer, and are given as an indication of what one ought to expect in ordinary commercial qualities:—

	No. 1	No. 2
Phosphoric oxide	.. 19.72 p.c.	20.09 p.c.
Lime	.. 21.95 „	26.42 „
Nitrogen	.. 3.71 „	3.53 „

GUANO.

The well-known manure guano consists of the dried excrement of sea birds, and is mentioned here because it usually contains a considerable proportion of tri-calcic phosphate, as well as small quantities of ammonium and potassium phosphates. It is found in several parts of the world, and varies much in composition according to the different conditions to which it has been exposed. In hot rainless countries it dries as fast as formed, with little change in composition; but if exposed to rain the ammonia and nitrates formed in it by decomposition get washed out, and it becomes chiefly phosphatic, with a low percentage of nitrogen. This is well seen by comparing the percentages of phosphoric oxide and nitrogen in two kinds of guano commonly used in South Africa:—

	Cape Guano.	Natural Bird Guano.
Phosphoric oxide	.. 8.53 p.c.	25.40 p.c.
Nitrogen	.. 11.44 „	0.92 „

QUESTIONS.

1. How many kinds of calcium phosphate are there? Give their names, and explain the difference in their composition.
2. What experiment would you make to illustrate the solubility of tri-calcic phosphate in acids?
3. Where do animals get the phosphate that is found in their bones?
4. Why are bones rather slow in acting as a manure, and mineral phosphates still slower?
5. Describe a method of making bones act more quickly.
6. What is guano? Why are not all guanos alike?
7. What would you think of a sample of bone-dust manure which on analysis gave 15 per cent. of phosphoric oxide and 35 per cent. of lime?

Tests for Students.

SOME USEFUL QUESTIONS AND ANSWERS.

THE following questions and answers were compiled by Mr. H. T. Edwards, of the Phillipine Bureau of Agriculture, and published in the *Journal of the Bureau*; and they are reproduced herewith as they will afford readers of these PAGES an excellent opportunity of testing their knowledge so far as their reading has taken them. In putting each question to oneself, it is a good idea to hide the answer by means of a sheet of paper, comparing it with your own answer later.

In later issues we shall have more questions from the same source.

1.—GENERAL AGRICULTURE.

Question 1: What is agriculture?

Answer: Agriculture is the business of raising products from the land.

Question 2: What does the farmer produce?

Answer: Crops, or plants and their products; stock, or animals and their products.

Question 3: What does the farmer furnish the world?

Answer: The farmer furnishes the world with a large part of the material used for food, clothing, and shelter, besides many other minor products.

Question 4: Into what four branches may Agriculture be divided?

Answer: (a) General Agriculture, (b) animal industry, (c) forestry, (d) horticulture.

Question 5: What does "General Agriculture" include?

Answer: General Agriculture includes the general management of lands and farms, and the growing of staple field crops, such as grains, fibres, sugar cane, hay, and root crops.

Question 6: What is "animal industry"?

Answer: Animal industry is the raising of animals, either for direct sale or use, or for their products.

Question 7: What three parts does animal industry include?

Answer: (a) Stock raising, or the growing of such animals as cattle, horses, and sheep; (b) dairy husbandry, or the production of milk and milk products; (c) poultry raising, or the growing of fowls, as chickens, turkeys, geese, and ducks.

Question 8: What is forestry?

Answer: Forestry is the growing of trees for timber and wood.

Question 9: What is horticulture?

Answer: Horticulture is the growing of fruits, garden vegetables, and ornamental plants.

Question 10: What are the most important things with which the farmer works?

Answer: (a) The soil, (b) plants, (c) animals.

2.—THE SOIL.

Contents.

Question 1: What is the soil?

Answer: The soil is that part of the solid surface of the earth in which plants grow.

Question 2: What is the soil made up of?

Answer: The soil is made up of small particles of rock (inorganic matter) and the remains of plants and animals (organic matter). When the soil is in a condition to grow plants it also contains water.

Question 3: What does the soil furnish?

Answer: The soil furnishes a place in which plants grow. It is also a great storehouse containing large quantities of plant food.

Question 4: What do we mean by "plant food"?

Answer: We all know that animals must have food if they are to live and grow. Plants, also, must have food, but plant food is quite different from the food of animals. Plants obtain their food from the soil and from the air. When a soil contains all the food that plants require we call it "rich" or "fertile." A "poor soil" contains only a small amount of plant food. When a farmer wishes to grow a good crop on a poor soil he must add more plant food to that soil. This plant food which farmers add to their soil we call "fertiliser."

Question 5: What are three important kinds of plant food?

Answer: (a) Nitrogen, (b) phosphoric acid, (c) potash.

Question 6: Do soils usually contain nitrogen, phosphoric acid, and potash?

Answer: Yes. Soils usually contain large amounts of these plant foods. It has been found that in average land on farms 8 inches of the soil on the surface of each hectare contain over 3,400 kilos of nitrogen, nearly 4,540 kilos of phosphoric acid, and even 19,000 kilos of potash. In some cases soils contain enough plant food to grow three hundred crops of rice or corn.

Question 7: Can all this plant food be used at once?

Answer: No. Only a small amount of this plant food in soils is available, or in a condition to be used at once.

Question 8: What do we mean by plant food in the soil that is "not available"?

Answer: Plant food in the soil that is not available is combined or "locked up" with other substances, so that we cannot use it. Each year a part of this food becomes separated or "unlocked" so that the plants

feed upon it or use it. Air, water, and the roots of plants all help to unlock this plant food.

Question 9: What is one reason why we should cultivate the soil?

Answer: One reason why we cultivate the soil is so that air, water, and the roots of plants can pass through it readily, and thus large quantities of plant food are made available.

Question 10: Why are the soils of forests fertile or rich?

Answer: In the forests none of the plant food is taken away. When the trees and plants die and decay, the plant food goes back to the soil.

Question 11: Why do the fields in which we grow crops become "poor"?

Answer: In cultivated fields the crops are grown and taken away. In doing this the farmer takes away from the land a large amount of plant food.

Question 12: What is the soil like?

Answer: The soil is like a great workshop or laboratory, where the roots of plants, air, moisture, and many other forces are always working. We should never talk of the soil as mere dirt.

The Principles of Manuring.

I.—WHAT MANURING MEANS.

PLANTS, like animals, require food in order that they may live; but, whilst the animal world obtains its nourishment from the plant world, the plant creation for its part has only the mineral kingdom to depend upon.

The food which a plant requires must be taken either from the soil in which it lives or else from the air, or from both sources. If we take a portion of a plant and heat it in a shovel over a fire for a sufficient length of time we shall eventually reduce it to a heap of ashes. In other words, the volatile portion of a plant has been driven off, and we are left with the mineral elements which were contained in the plants before we exposed it to heat. These elements and the proportions in which they occur are not the same in all plants, but the following are the names of the substances which have, at one time and another, been found in various plants, *viz.*:— Potash, lime, magnesia, oxide of iron, phosphoric acid, sulphuric acid, soda, silica, chlorine, oxide of manganese, lithia, rubidia, alumina, oxide of copper, bromine and iodine. Of these substances the first six are absolutely necessary to plant growth. Besides these ash constituents, the plants also require nitrogen.

Of these seven essential constituents, however, some are of far more importance to the farmer than others, owing to the fact that they are present in the soil in smaller quantities as a rule than are the other

lesser important substances—or rather, it should be said that they are present in *available* form in a smaller degree. These substances are nitrogen, phosphoric acid, and potash. The business of the practical farmer, so far as manuring is concerned, is to ensure that these three substances in particular are present in the soil in such proportion and to such an extent as the particular crop he is growing is concerned.

Before we go any further it will be advisable to make clear a point which is often not fully understood, and which is consequently sometimes the cause of mistakes in manuring. It is not sufficient for a farmer to know—for example, by analysis—how much nitrogen, phosphoric acid, and potash there is in the soil; what he needs to know, for immediate purposes, is how much of these substances in an *available* form his soil contains. In other words, it is only a certain proportion of the total quantity of any given substance in a soil which the plant is able to make use of; the balance—that is, the portion which cannot be made use of by the plant—will become *available* for use sooner or later, but for immediate purposes it is valueless. “Available” plant food is that which is soluble in water, the portion not available being that which is not soluble in water, owing to its not having yet undergone the chemical changes which will make it so. It must be understood that plants can only take up nourishment through their roots when it is dissolved in water, and this is one very important reason why water is essential to the life of plants.

Manures may be divided into two great classes, *viz.*: (a) *Direct* manures, or those which, by supplying to the soil necessary plant food constituents, contribute directly to fertility, and (b) *Indirect* manures, or those which affect the fertility of the soil in an indirect way. Direct manures, again, may be divided into “general” manures and “special” manures, the former containing all the elements necessary to plant growth that need to be supplied as manures, and the latter containing certain of these elements only according to the requirements of the crop for which they are intended.

Prof. Aikman, in his book on “Manures and the Principles of Manuring,” which I shall refer to frequently in these articles, divides manures into the following three large classes, and I quote them here as they contain examples of manures belonging to each of the three classes:—(1) Manures, the action of which is both direct and indirect—*e.g.*, green manures, farmyard manure, composts, and sewage. (2) Manures which may be regarded as having only a direct action—*e.g.*, guano of all kinds, bones in all forms, nitrate of soda, sulphate of ammonia, dried blood, superphosphates, mineral phosphates of all kinds, horns and hoofs, shoddy, wool-waste, fish-guano, muriate of potash sulphate of potash, and kainit. (3) Manures which may be regarded as having only an indirect value—*e.g.*, lime, mild and caustic, marl, gypsum, salt, etc.

Poultry Notes.

It is useless to expect hens to lay all summer and all winter. They must have a time in which to rest, recuperate and throw off their old and take on their new plumage.

Ducklings are easy to brood and easy to feed. They will stand more neglect and still live than will chickens, but it does not by any means pay to neglect them.

The comb of a hen or pullet, if it shows up good and red, indicates that the bird is in good condition and laying time is near at hand.

In selecting the breeding stock, the first consideration must be health, backed by constitutional vigour, followed by form, colour, and docility, and in mating these qualities must be kept constantly in view.

Do not lose your temper and abuse the sitting hen when she leaves the nest, gets on the wrong nest, or breaks a few eggs. A hen is only a hen, and perhaps you are more to blame than the hen. Sitting hens to give good results should be kept apart from the other birds in semi-darkness.

When it is wet or cold a little corn should be burned in the peat each morning, as it teaches the birds to go back into the house again after they have been fed, and avoids them standing about in the corners of the run, as they are wont to do at this time of the year.

The safest rule is to feed sparingly of anything. Never give enough of any one thing, so any of it is left over. They should always be eager for their food, keep them scratching, and always ready for a little more. This means contented, happy chicks that will thrive and grow into the right kind of fowls.

Eggs from hens usually produce stronger chickens than the eggs from pullets.

Crowded quarters retard the growth and injure the health of the chickens, so give them plenty of room.

Pure-bred fowls, of the utility varieties, are better for their purposes than nondescripts.

These fowls require proper housing and management.

Farmers near good markets have exceptional opportunities to obtain the highest prices for strictly new-laid eggs and the superior quality of poultry.

Farmers are able to enter into favourable competition with any rivals.

Whether near a city market or not, the new-laid eggs should be sold as quickly as possible. Special effort should be made to do this in winter or in summer.

Clean-looking and neatly-put-up new-laid eggs and well-dressed poultry, of good quality, will sell better than any other kind.

Dairy "Don'ts."

Don't put the calf in a cold building; keep it warm.

Don't sit in a crouching position when milking.

Don't milk the pail full to the brim and then kick the cow if she spills some of it.

Don't strike at the cow that strikes at you because her teats are sore; apply a little vaseline to them.

Don't fail to wash and dry your hands before milking.

Don't put your fingers in the milk.

Don't milk without having first brushed your clothes.

Sheep Notes.

The breeding ewes should be kept strong and thrifty. .

Generous and judicious feeding and care mean satisfactory profits in sheep raising.

Rough, stony pastures will often cause lameness in sheep.

Examine the sheep's feet for tufts of grass wedged between the toes. These will cause lameness.

The greatest care should be given the selection of the breeding ewes. Breed only from the best. Always use a pure-bred ram.

The type of sheep that combines a large body with a good fleece is the one for the small flock-owner.

Charcoal for Pigs.

It has been noticed that pigs, especially when kept in confinement, appear to have a craving for what might be called unnatural substances, and would eat greedily such substances as charcoal, wood ashes, mortar, etc. Some of these may not be good for the animals, but it is pretty certain that charcoal is a stomach corrective, and it is good practice to keep a stock on hand for this purpose. Where there is plenty of timber near the farmer can readily prepare charcoal by burning wood under a cover of earth.

If charcoal is not provided, keep constantly before the pigs a mixture of one part of sulphur and about ten of wood ashes. Some such condiment appears to be required by pigs, especially in winter, to prevent derangement of the stomach. Pigs that are outdoors in summer and have access to earth and vegetable matter have little need of other correctives.—(*Live Stock Journal.*)

Meteorological Returns.

Meteorological Observations taken at Govt. Stations for Month of December, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain-fall in 1 day.		Total for Year from July 1st, 1909.	Total for same per'd from July 1st, 1908.	
	Maximum	Minimum					Fall.	Day.			
Observatory ..	80.8	67.3	90.2	61.8	8.07	22	1.60	26th	22.54	19.62	
Stanger ..	85.1	67.2	108	60	9.77	21	2.72	16th	27.50	20.90	
Verulam ..	86.4	67.7	106	62	6.19	16	3.10	25th	18.19	2.66	
Greytown ..	85.3	56.3	98	47	5.76	15	1.70	25th	16.82	19.37	
Newcastle ..	88.3	47.7	98	40	7.77	13	2.20	25th	15.22	—	
Lidgerton ..	82.3	52.4	98	40	8.02	18	1.95	26th	18.69	17.43	
Edgettourt ..	87.3	57.2	98	48	8.40	18	1.78	11th	14.22	12.88	
Umbogintwini ..	81.3	66.2	92	60	7.88	23	1.56	17th	24.47	—	
Mid-Illovo ..	78.1	59.7	97	62	9.02	21	3.95	26th	22.90	21.33	
Imbizana ..	81.1	63.4	90	54	6.55	19	2.50	26th	21.52	23.93	
Port Shepstone ..	85.2	62.3	90	58	3.50	8	1.00	25th	20.75	24.56	
Umzinto ..	81.7	58.1	91	51	8.85	12	1.00	25th	24.53	21.59	
Richmond ..	78.7	58.6	95	50	9.94	25	2.31	25th	25.38	24.99	
Maritzburg ..	81.5	60.7	103	53	5.39	21	1.18	25 h	14.66	16.18	
Howick ..	81.3	57.2	98	48	5.92	15	1.20	25th	15.71	17.57	
Ladysmith ..	80.9	61.3	102	51	7.42	17	1.93	23 d	12.79	—	
Dundee ..	86.2	60.7	94	62	4.80	10	1.88	17th	13.23	18.19	
Weenen (aal) ..	94.2	61.0	106	56	6.23	16	2.35	15th	12.25	15.39	
Krantzkloof ..	75.3	—	91	—	9.10	21	2.18	26th	24.65	20.65	
Cam erdown ..	82.8	59.1	99	43	4.24	14	1.70	25th	13.11	13.23	
New Hanover ..	87.3	59.5	102	49	11.28	13	5.05	26th	21.92	20.31	
Krantzkop ..	88.2	54.1	95	50	6.61	21	2.16	25th	19.32	15.55	
Nq tu ..	84.3	60.8	90	40	8.29	9	2.50	15th	—	18.76	
Nongoma ..	83.0	61.7	96	52	7.39	15	1.50	26th	16.79	—	
V yheid ..	82.5	60.0	94	52	10.56	15	3.60	26th	19.10	21.40	
Utrecht ..	90.3	45.5	97	39	8.76	11	1.85	15th	13.68	—	
Ngoni Forest ..	78.2	57.9	90	50	18.75	21	1.08	25th	38.75	—	
Kupangeni ..	87.5	66.3	101	61	8.53	16	2.10	25 h	27.19	21.82	
Uthulho ..	80.3	63.9	96	55	10.47	14	3.25	21st	26.10	20.85	
Munzini ..	86.8	56.1	98	54	10.48	10	2.85	16th	43.51	30.98	
Point ..	—	—	—	—	7.93	17	1.73	25th	21.26	24.08	
Cleveland West ..	—	—	—	—	8.87	18	2.10	15th	—	—	
Nottingham Rd. ..	80.0	62.4	96	41	6.05	18	1.12	25th	11.92	—	
Char estown ..	77.5	54.6	87	41	8.17	14	1.18	21th	16.84	17.43	
Bulwer ..	—	—	—	—	9.69	25	1.66	25th	21.30	26.67	
Ixopo ..	—	—	—	—	5.41	23	1.56	26th	18.13	18.83	

Meteorological Observations taken at Private Stations for Month of December, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain-fall in 1 day.		Total for Year from 1st July, 1909.	Total for same period from July 1st, 1908.	
					Fall.	Day.			
Adamshurst ..	105	49	5.32	16	1.07	25th	—	14.51	
Hilton ..	95	50	6.85	19	1.39	24th	18.72	18.34	
P.M.B., Botanical Gardens ..	100	48	5.73	20	1.22	25th	16.29	17.45	
Ottawa ..	—	—	5.83	15	2.07	25th	19.69	—	
Mount Edgcombe ..	—	—	7.79	19	2.66	26 & 27	23.42	21.47	
Equefa ..	—	—	—	—	—	—	—	—	
Umzinto, Beneva ..	—	—	5.80	17	3.66	25th	20.19	21.50	
Riet Vlei ..	—	—	5.01	17	1.43	20th	10.92	14.48	
Cedara—Hill Station ..	100	44	3.05	30	50	30th	—	—	
Vlei Station ..	98	49	5.34	21	1.55	26th	—	—	
Winkel Spruit ..	89	51	5.76	19	1.34	25th	21.56	21.81	
Weenen ..	101	46	5.97	31	2.42	1st Jan	9.43	—	
Giant's Castle ..	77.52	52.86	7.45	21	1.22	17th	16.21	—	
Umhlangeni ..	90	—	6.61	17	2.60	26th	23.7	25.51	

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of December, 1909:—

COLLIERY.	Average Labour Employed.					Output. Tons. Cwt.
	Productive Work.			Unproductive Work.	Total.	
	Above Ground.	Below Ground.	Total.			
Natal Navigation ..	381	710	1,091	10	1,101	28,233 18
Durban Navigation ..	270	700	970	—	970	21,211 0
Elandslaagte ..	288	587	875	16	891	18,736 1
St. George's ..	223	456	679	—	679	15,767 0
South African ..	119	340	459	26	485	13,124 9
Dundee Coal Co. ..	243	149	692	—	692	13,292 14
Glencoe (Natal) ..	182	363	545	51	596	11,743 18
Natal Cambrian ..	213	396	609	6	615	11,544 14
Hlobane ..	127	293	420	21	441	9,207 8
Talana ..	123	412	535	24	559	8,621 2
Hatting Spruit ..	88	174	262	11	273	7,143 6
Newcastle ..	75	317	392	11	403	6,872 8
Natal Steam Coal Co. ..	80	204	283	10	293	6,032 11
Ramsay ..	103	155	258	—	258	4,750 10
Bullengruijch ..	76	108	184	10	194	1,951 7
West Lennoxton ..	54	82	136	—	136	1,745 2
Burnside ..	—	—	—	412	412	1,471 5
Moosiklip ..	—	34	34	—	34	169 3
Dewar's Anthracite ..	7	7	14	—	14	74 6
Vaalbank ..	—	1	1	1	2	10 0
Makalees Kop ..	3	—	3	—	3	7 0
Totals	2,664	5,791	8,455	615	9,070	182,611 15
Corresponding month, '08 ..	2,587	5,177	7,764	701	8,465	153,312 14

	Productive Work.			Unproductive Work.	Total. Dec., 1909.	Total. Dec., '08.
	Above Ground.	Below Ground.	Total.			
Europeans	199	168	367	85	452	470
Natives	969	3,664	4,633	318	4,951	4,752
Indians	1,496	1,959	3,455	182	3,637	3,293

* Cost Charged to Capital Accounts

§ Includes November return.

Mines Department, Maritzburg, 10th January, 1910.

CHAS. J. GRAY,

Commissioner of Mines

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal bunkered and exported from the Port of Durban for the month of December, 1909:—

				Tons. Cwt.
Bunker Coal .. ..	..	..	..	110,819 5
Coal Exported .. ..	..	..	..	27,957 17
Total				138,777 2

Customs House, Port Natal,
4th January, 1910.GEO. MAYSTON,
Collector of Customs.

Return of Farms at Present under Licence for Lung-sickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	Natives ..	Goedgedacht
A. B. Koe ..	Portion of Estcourt	"	Natives ..	Rootpoort
		"	R. Mattison ..	Calc tt
		"	W. Crouch ..	Oakh mpton
		"	H. Hatting ..	Driefontein
A. C. Williams ..	Utrecht ..	"	H. Woods ..	Longwood
		"	S. Grobler ..	Kimpley
		"	P. L. Uys, jun. ..	Uitzoek
L. Trenor ..	Alfred ..	"	Natives ..	Uitzoek
		"	Yalwayo ..	Location
		Lung-sickness	J. T. Clothier ..	Whitecliff
J. Rolfe ..	Lion's River ..	Scab	E. F. H. Garlan ..	The Refuge
H. Wingfield-Stratford	Newcastle ..	"	W. G. Shaw ..	Colb urne
		"	G. Dimock ..	Alicedale
		"	D. Neumann ..	Munro W nkel
		"	L. Havemann ..	Vengelegen
G. Daniell ..	Vryheid ..	"	L. J. de Jager ..	Scheulhoek
		"	N. M. Gunter ..	Kromellenb og
		"	Natives ..	Roodepoort
J. R. Cooper ..	Nkandhla & Nqutu	"	" ..	Yorkshire
E. Varty ..	Western Umvoti ..	"	" ..	Haladu
		"	D. C. S. Nel ..	Batshe
		"	H. Hansmeyer ..	Highfield
		"	Natives ..	Onrust
		"	Natives ..	Summerfield
R. Mayne ..	Eastern Umvoti ..	"	F. B. Nel ..	Vermak's Kraab
		"	Natives ..	Kran Vlei
E. W. Bowles ..	Ixopo ..	"	J. P. C. Nel ..	Spitzkop
		"	Native ..	Location
		"	Natives ..	Batmand
		"	" ..	Location No. 8
		"	" ..	Lot BB
		"	" ..	Lot A of 4
		"	F. Herbert ..	Normandale
A. H. Ball ..	Weenen ..	"	L. Howes ..	M rnington
		"	J. P. Lotter ..	B rg Vlei
		"	P. H. Van Rooven ..	buffels Hoek
		"	P. P. van Rooyen ..	Doornkloof
		"	Naude & Lotter ..	Scottshoek
A. F. Smith (acting)	City, Un geni ..	"	J. T. van Rooyen ..	Belle Vue
A. J. Marshall ..	Dundee ..	"	Laduma ..	Zwaartkop Location
		"	Natives ..	Klipport
		"	" ..	Blinkwater
		"	" ..	Hartebeestfontein
		"	G. F. Dannhauser ..	Cartwell
		"	T. C. Koekmoor ..	Maybole
B. Klusner ..	Lower Umzinkulu	Lung-sickness	N. B. Swarts ..	Rooikop
J. F. van Rensburg	Ngotshe ..	Scab	Nyapu ..	Berbeck
		"	A. M. Potgieter ..	Tochevonde
E. W. Larkan ..	msinga ..	"	H. B. J. Bester ..	Town Lands
K. Ripley ..	Emtonjaneni ..	"	Native ..	Vermak's Kraa
		"	Native ..	Mo genzon

Milk that is well cooled and carefully strained will keep much longer than that which is not thus treated.

Some people don't like to use sweat pads on their horses, but they are a good thing for a horse that has tender shoulders. If you have two, change at noon while working horses in warm weather.

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified:—

ON THE 2ND FEBRUARY.

Dundee (1) Kafir ram, no brands, probable value, 10s. Impounded by Natal Police, Vants Drift. (2) Four Kafir ewes, with two lambs at foot, no brands. (3) White goat and kid, no brands.

Good Hope (Klip River Division)—Four Angora rams, one right ear split. left ear point cut off square, three left ears swallow tail, both ears pieces chipped out back and front. Probable value, £3 Impounded by E. Bloy.

Mount Hope (Klip River Division)—(1) Ewe goat, aged, left ear V cut out of both ears at tips, and slit out of right ear. (2) Ewe goat kid, marks same as above (3) Merino ewe, branded turned B on left side, O cut out of both ears. (4) Merino lamb, no marks or brands.

ON THE 23RD FEBRUARY.

Ashley (Ixopo Division)—Two young goat rams, one black; one black, brown belly and legs. Probable value, 5s. Impounded by Kangu

ON THE 2ND MARCH.

Pietermaritzburg (1) Brown mule mare, branded two P's on neck, one upside down, with small V in front, small G on shoulder, small J inside a large B on near quarters, aged, impounded from Zwaartkop. (2) Small bay mule mare, branded No. 3581 or 7 on hip, OB on quarters. This animal is running on the farm "Short's Retreat," and was reported by a native named Umvoka as too wild to be driven to the Pound

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 123.—Married man, 35 years of age, with 5 years' experience on poultry and stock farm in California, wishes to get on to a farm in Natal. His wife is a good cook and handy in dairy. Would be willing to work for a very small wage or for their keep or a period of twelve months at least, after which they would expect some remuneration. Can produce first class personal references.

No. 124.—Practical man, age 35, unmarried, seeks position on any work. Can undertake or attend to any building work and erection of machinery, and has been accustomed to control of coloured labour. Could undertake management of small creamery. Not afraid of work. Has had considerable experience in Agriculture, and can produce highest references.

No. 125.—Single man, age 31 years. Was brought up on a farm in England. Is a tinsmith and plumber by trade, also has a good knowledge of carpentry. Speaks Dutch. Has been in South Africa for ten years.

No. 126.—Colonial, 35 years of age, desires to obtain a position as overseer or manager of an ostrich farm. Has been for some years with first-class farmers, and had charge of some of the best birds in the Cape Colony. Has a practical knowledge of incubating, rearing of chicks, dosing and general management.

No. 127.—An expert fruit packer of four years' experience in Spain and France, and twenty years Colonial experience, is open to accept an engagement up to February, 1910. He is open to accept low wages, with board and lodging, and fare to and from the Cape where he is at present.

No. 128.—Wishes to secure employment on a farm. States that he has a general knowledge of engineering, and has been employed on a large and well-known farm in the Richmond Division.

No. 129.—Wishes to secure employment on a farm. Experience in gardening and agricultural work generally, but more especially the former.

No. 130.—Age 22. Understands farming and is a good Zulu linguist. Desires situation on a farm, more especially as manager.

No. 131.—Age 20. Was a student at College of Agriculture, Cape Colony, where he gained a diploma. Has also won prizes for butter making at the Rosebank and Port Elizabeth Shows. Has been in the services of the Orangia Creamery Co., Bethlehem, which he left on account of conditions of employment not being suitable to his requirements.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

EMPLOYMENT FOR GIRLS.

The Minister of Agriculture has received a letter from the Chairman of the Transvaal Land Settlement Board, stating that he has been asked by several correspondents in England if there are any openings in South Africa, such as in creameries, for girls trained at Bromsgrove Colonial College and other such training centres in England. We should be glad to hear from any institutions or farmers in Natal who may be in a position to offer situations to girls who have been trained at such Colleges, when we shall be pleased to place them in communication with the Chairman of the Transvaal Land Settlement Board.

Government Laboratory.

SCALE OF CHARGES FOR ANALYSES, VACCINES, ETC.

The following is the scale of charges fixed for analyses, etc., at the Government Laboratory, Alberton, Pietermaritzburg:—

Drinking-water Analysis:		£	s.	d.
Chemical	.. .. .	2	2	0
Bacteriological	.. .. .	5	5	0
Milk, Analysis	.. .. .	0	10	6
Sputum, Bacterioscopic examination	.. .. .	0	5	0
Biological test for Tubercle	.. .. .	1	1	0
Throat-swabs for Diphtheria (prepared swabs obtainable on application):				
Bacteriological Report	.. .. .	0	2	6
Urine, ordinary clinical examination	.. .. .	0	5	0
Quantitive estimation of glucose	.. .. .	0	10	6
Biological test for Tubercle	.. .. .	1	1	0
Fæces, for Ankylostomiasis	.. .. .	0	2	6
Blood (collecting outfit obtainable on application)				
agglutination test for Typhoid (Widal), Paratyphoid, Malta Fever, etc.	.. .. .	0	5	0
Tumours and Morbid Tissue:				
Microscopic examination	.. .. . 10s. 6d. to	2	2	0
Post Mortem examinations	.. .. . 10s. 6d. to	5	5	0
Toxicological examinations	.. .. . 10s. 6d. to	21	0	0
X-ray examinations, blood-counts, etc., by special arrangement.				

The following sera, vaccines, etc., are issued at the prices indicated:—

Anthrax Inoculation, per double dose of two inoculations	0	6
Anti-Diphtheritic Serum, per dose	5	0
Anti-Streptococcic Serum, per dose	2	0
Anti-Tetanic Serum, per dose	2	0
Mallein, per dose	0	4
Tuberculin, per dose	0	4
Anti-Venene (for snake bites), per dose	5	0
Blue Tongue Vaccine, per 25 doses	2	0
Blue Tongue Curative Serum, per 50 cub. c.	2	6
Quarter Evil Vaccine (in five and ten dose packets), per dose	0	3
Q. E. V., Double Inoculation, per dose	0	6

Appliances for inoculations, syringes, etc., are also supplied from the Laboratory.

Division of Agriculture & Forestry Notices

FEES FOR AGRICULTURAL ANALYSIS.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experimental Farm, Cedara, in accordance with the following scale of fees, which is subject to revision :—

	Scale I.	Scale II.
	£ s. d.	£ s. d.
FERTILISERS AND FEEDING STUFFS :		
Determination of 1 constituent	0 7 6	0 5 0
Determination of 2 or 3 constituents	0 15 0	0 10 0
Complete analysis	1 1 0	0 15 0
SOILS : Partial analysis of a soil in relation to its fertility	1 1 0	0 10 6
Complete analysis of a soil	2 2 0	1 1 0
WATER : Irrigation and drainage	1 10 0	0 10 6
VEGETABLE PRODUCE : Fodder, Ensilage, Grain, &c.	1 10 0	0 15 0
MILK, CREAM, BUTTER : Fat only	0 5 0	0 2 6
" " : Complete	0 15 0	0 7 6
WATTLE BARK AND TEA : Tannin	0 5 0	0 2 6
CATTLE DIPS : Quantitative analysis of 1 to 3 principle constituents	0 10 0	0 5 0
INSECTICIDES :		
Qualitative analysis each constituent	0 5 0	0 2 6
Quantitative " " " "	0 10 3	0 5 0

Scale No. 1 is applicable to samples handed in by merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Director, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis performed by it ; and, where such is deemed of sufficient public interest, it will remain at the discretion of the Director to remit any charges hereunder.

TREES FOR SALE.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casaurinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 6d. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders cannot be accepted for a smaller number than 100 trees.

PURCHASE OF TREE SEEDS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for sale. Not less than one pound will be purchased ; and a specimen bearing seed vessels or flowers should be sent for identification purposes.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

POULTRY.

Orders will be received for eggs for sitting of the following breeds for immediate delivery :—Buff Orpingtons, White Leghorns, Silver Wyandottes and Plymouth Rocks.

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

WOOLLED SHEEP.

Offers are invited for young imported Rams being Rambouillet Merinos, Lincolns, Hampshires, Shropshires. Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible:—

Admittance of Students to the School of Agriculture.—House Master, Cedara.
 Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.
 Felling Licenses, Purchases of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.
 Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.
 Agricultural Seeds, Livestock, etc.—Farm Manager, C.N.F., Cedara.
 Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.
 Agricultural Seeds, etc., for Irrigation Farming.—Curator, Govt Station, Weenen.
 Fruit.—Orchardist, Cedara.
 Accounting Business.—Accounting Clerk, Cedara.
 Woolled Sheep, Woolled Classings, &c.—Wool Expert, Cedara.
 Apiculture—Aviapist, Cedara.

E. R. SAWER,

Director, Division Agriculture and Forestry, Cedara.

Farm Apprentices' Bureau.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

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|--------|---------|---|
| No. 2. | Age 15. | Has had 18 months' experience of farming. Understands more about forestry than general farming. Speaks Zulu, and understands Dutch. |
| „ 3. | Age 24. | Colonial born. Has a knowledge of bookkeeping. |
| „ 13. | Age 20. | Is an orphan. Is anxious to learn farming. |
| „ 15. | Age 19. | Is desirous of learning farming. |
| „ 25. | Age 23. | Bricklayer by trade. Is anxious to get on a farm. |
| „ 27. | Age 19. | Has had one year's experience on a farm in the Cape Colony. |
| „ 30. | Age 15. | Transvaal born. Has had experience on a mixed farm. Speaks Dutch and Zulu. |
| „ 34. | Age 18. | Has a slight knowledge of Zulu. Understands carpentry. |
| „ 35. | Age 21. | Has had five years' experience on farms. Understands cattle and horses and Agriculture. Is anxious to get back on a farm. |
| „ 39. | Age 19. | Has had twelve months' experience on a fruit farm in the Cape Colony. Speaks Dutch. |
| „ 40. | Age 24. | Has had a little experience of farm life. Understands bee-keeping. Is anxious to get on a farm. |
| „ 46. | Age 21. | Served a term of apprenticeship to a firm of agricultural implement makers. Industrious and level-headed lad. Very good references. |
| „ 47. | Age 21. | Is anxious to obtain a situation on a farm. Has been in ironmongery trade for 2½ years. |
| „ 48. | Age 18. | Has had 4½ years' experience in agricultural and stock farming in the Dundee and Ixopo Divisions. Has had a good deal of experience with cattle, but not much with sheep. Has also had experience with poultry and a little with bees. Is a good Zulu linguist. |
| „ 49. | Age 21. | Colonial born. Has had three years' experience on farms, two years in the Mooi River Division and one year dairy farming in the Transvaal. Good references. Speaks Zulu. |
| „ 50. | Age 15. | Has not had any experience on a farm, but is anxious to learn farming. |
| „ 51. | Age 21. | Is very desirous of getting on to a stock farm. Is strong and healthy. Has had a fair training in bookkeeping. |

Executives of Farmers' Associations.

*** The Editor will be obliged if the Secretaries of Farmers' Associations and similar institutions will kindly keep him advised with regard to changes in the personnel of their Executives.*

ALEXANDRA AGRICULTURAL AND HORTICULTURAL ASSOCIATION.—President: Wm Thompson. Hon Vice-Presidents: A Blamey, E W Hawksworth, Thos Kirkman, H Basley, J L Knight, R.M. Hon Secretary and Treasurer: Geo Lamb. Hon. Auditor: W B Brunner. Committee: W Arnott, H G Arbuthnot, R C Archibald, R G Archibald, J Bazley, A Behrmann, W Cooke, G J Crookes, R Cruickshank, H D Hawksworth, H E Hawksworth, A F W Hawksworth, R C Hawksworth, J Landers, D McAndrew, F Nelson, C A Preston, Dr. Rouillard, W A Gilbert, Fred Blamey, Rev B M Ford, S C Hawksworth, J C Landers, S F Crookes, J J Crookes, R A Lindsay, J A Curle, F B Preston, R Parkin, H Reynolds, J B Stewart, C Taylor, H H P Waller, J Ross, Rev W C Wilcox, Dr W P Tritton.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A G Prentice, J.P. Vice-Presidents: C Knox, J.P., C F Rethman and C A Holwell. Hon Secretary and Treasurer: H C Hitchins. Committee: C M Etheridge, H S Morgan, Rev S A Aitchison, J.P., W B Rethman, Dr W Case, J.P., H W F Rethman, R G Mack, E J Gray.

BOSTON FARMERS' ASSOCIATION.—President: Thos. Fleming, J.P. Vice-President: T. W. Rudland. Hon. Secretary: W. J. Fly, J.P. Hon. Treasurer: H. A. Phipson.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, J.P. Vice-Presidents: J Gavin and John W Harvey, J.P. Hon Secretary: W E Allsopp.

CAMPERDOWN DIVISION FARMERS' ASSOCIATION.—President: C J A Scheepers. Vice-President: F N Meyers. Hon Secretary and Treasurer: J Baker. Committee: J Gavin, J W Harvey, J.P., C Baker, J Moon, J.P., H A Meyers, J F Scheepers, J Galtrey, B B Buchanan. Secretary and Treasurer: Jas Baker, P.O., Umlaas Road.

CHARLESTOWN FARMERS' ASSOCIATION.—President: Johannes Vos. Vice-President: — Adendorff. Secretary: W. J. Curnow. Treasurer: J. O. Thomas. Committee: H. O. Eksteen, J. P. Vos, J. C. Uys, W. G. Thomas, D. Doyer, F. A. R. Johnstone, M.L.A., G. E. Lane, S. R. Higgins, B. F. Johnstone, A. J. Johnstone, J. J. Eksteen, R. H. Greaves, Peter Thompson, G. McArthur, and V. B. van Rooyen.

DRONK VLEI FARMERS' ASSOCIATION.—President: Capt A W B Perceval. Vice-President: J H Dalgarno. Hon Secretary and Treasurer: A Hodson Creighton.

DUNDEE AGRICULTURAL SOCIETY.—President: T. P. Smith. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs F Turton, H. Ryley, and A W Smallie. Hon Secretary and Treasurer: J McKenzie. Committee: G M De Waal, B J Humann, R Doidge, H P Walker, T J Williams, W Springorum, H W Walwyn, W J H Muller, D M Meunann, H J Head, C T Vermaak, A L Jansen, J Campbell, H Greenhough, D W H Tandy, A E Norman.

DURBAN AND COAST SOCIETY OF AGRICULTURE AND INDUSTRY.—President: E. W. Evans. Vice-Presidents: Sir B. W. Greenacre, A. M. Campbell, Hon. Marshall Campbell, M.L.C., W. Adams, Frank Stevens, C.M.G., M. S. Evans, M.L.A., P. D. Simmons, W. R. Poynton, Hon. C. G. Smith, M.L.C., G. S. Armstrong, M.L.A., H. R. Bousfield, W. G. Brown, C. Henwood, J. Livingston, John Nicol, C.M.G., H. H. Puntan, R. H. Wisely, V. Seymour, H. Sparks. Secretary: John Morley. Committee: J. Ellis Brown, J. Burman, C. A. L. Bull, D. Doyle, Samuel Deane, James Henderson, W. Konigkramer, W. D. Kimber, W. J. Mirrlees, W. Milne, J. Swales, W. J. Thompson, C. Wilson, Wilfred Payne, Wallis Short, S. T. Amos, J. McBride, F. M. Hillier, W. A. Stocken, and W. A. Bath. Treasurer: Edwin Greenacre. Auditor: W. Murray Smith.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J H Colenbrander. President: J McIntosh. Vice-Presidents: H Westermeyer, R R McDonald. Committee: F R W Behmer, G Compton, H Freese, W Freese, W Gillitt, H W Konigkramer, H W Nichols, F Schaefermann. Hon Secretary and Treasurer: Frank J Volek.

EMPANGENI AND DISTRICT SUGAR PLANTERS' AND FARMERS' ASSOCIATION.—President: Col. C. B. Addison. Vice-President: P. Stott. Secretary and Treasurer: F. Piccione, P.O. Empangeni. Executive: P. Addison, G. Higgs, — Salveson, — Blake.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J R Pennefather. Vice-President: C F Adams. Secretary: T Parkias. Treasurer: W T Brockwell.

GOURTON FARMERS' ASSOCIATION.—Chairman: M Sandison. Vice-Chairman: R Gray. Hon Secretary and Treasurer: Frederick B Burnard, Highfield P.O. Committee: Dr Landon, J.P., E Reed, J Woods, C van der Merwe.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: A W Smallie. Vice-President: Thos Brookes. Hon Secretary and Treasurer: R J Hearn. Committee: G Queddon, N Glutz, Wm Craig, W R Queded, W T Heslop, Thos Dewar, A E Norman, D P Campbell, J J Grove, H J Hearn, D W H Tandy, J B Pendar, J Campbell, J Barbour.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C Gold, Dartford, Underberg. Vice-Presidents: F E Peto, G H Royston, J B Nicholson. Hon Secretary and Treasurer: G Palframan, Watermead, Underberg. Executive Committee: G Malcolm, W S Johnston, P McKenzie, F E Peto, J S Gordon. Yard Steward: D T Malcolm. Auditors: T C Dearlove and F E Peto.

HOWICK FARMERS' ASSOCIATION.—Chairman: Thos Morton. Vice-Chairman: M A Sutton. Hon Secretary and Treasurer: A Clark.

INGOGO FARMERS' ASSOCIATION.—President: E. W. Noyce. Vice-Presidents: G. A. Finstone and D. A. Drummoad. Hon Secretary and Treasurer: C. Drummoad. Committee: W C F Napier, A Paine, A J Garriock, A Wood, J.P., J H Green-Thompson, G H Bishop.

IXOPO AGRICULTURAL SOCIETY.—President: F L Thring, J.P. Vice-Presidents: Col W Arnott, B.M.R., W K Anderson, J.P., C E Hancock, J.P. Committee: John Anderson, Thos Allen, J C Auld, H D Archibald, F S Benningfield, S Boyd, T L Clarence, F E Foxon, R.M., Wm Foster, Jas T Foster, C C Foster, Geo E Francis, I Gray, A M Greer, J.P., J R Greer, Wm Gold, H A Hill, C F Harris, A E Keith, R Kennedy, Geo Martin, W Oakes, L J Phipps, T F Remfry, J W Robinson, Jas Schofield, M.L.A., D C Smail, A Stone, W R Way, A H Walker, M.L.A., P D Webb. Hon Secretary: G C Way. Hon Assistant Secretary: A G Harris. Hon Treasurer: T Arnott.

IXOPO FARMERS' ASSOCIATION.—President: C. E. Hancock, J.P. Vice-Presidents: T. F. Remfry and R. Vause. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers' Union: Col. Arnott and T. F. Remfry, with W. D. Campbell as reserve. Committee: John Anderson, W. Oakes, D. Campbell, G. C. Way, James Foster, A. Keith, G. Martin, F. Z. Thring, A. C. Kirkman.

KILIP RIVER AGRICULTURAL SOCIETY.—President: Daniel Bester, Vice-Presidents: Herman Illing, J G Bester, Wm A Illing. Secretary and Treasurer: Edward V Bambrick (Box 90, Ladysmith). Executive Committee: A Brink, J Farquhar, C.M.G., M.L.A., W C Hattingh, J G Hyde, Trev Hyde, A I Horsley, W Freer, L A Leonard, H Nicholson, H C Thornhill, Herman Illing, D Munger, P de Waal, J H Newton, D Sparks, J.P., J T Francis, A W (Gus) Illing, G Pinkney, W Cochrane, George L Coventry, and *ex officio* officers.

KRANTZKOP FARMERS' ASSOCIATION.—President: Capt M Landsberg. Vice President: P R Vermaak. Hon Secretary and Treasurer: G T van Rooyen. Committee: C J van Rooyen (Albany), C J van Rooyen (Wonderfontein), J. A. G. Mare, L M van Rooyen, Jnr, R P Martens, J P Nel, Dr Prokash, and F E van Rooyen.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson. Vice-President: H Nisbet. Executive Committee: H Nisbet, M A Sutton, A J Holmes, J Humphries, Jno Pole, and W A Lawton. Auditor: W J R Harvard. Hon Secretary and Treasurer: Arthur F Dicks, P.O. Box 1, Howick.

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LOTENT FARMERS' ASSOCIATION.—President: J A Tod. Vice-President: T Carter. Hon Secretary: A Kennedy Stone.

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MOOI RIVER FARMERS' ASSOCIATION.—President: R Garland. Vice-President: C B Lloyd. Hon Treasurer: H A Rohde. Collector: Capt W H Stevenson. Auditor: Claude Seott. Hon Secretary: H B Hall.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos Thresh. Vice-Presidents: Wm Lilje, E A Grantham. Secretary and Treasurer, C A Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T Braithwaite, Ernest Rottcher, C H Tilbrook, Rev H Rottcher (Hon Life Member).

NEWCASTLE.—President: F A R Johnstone, J.P. Vice-President: C Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O Schwikkard, C.M.G., Newcastle. Secretary: Wm Beardall. Treasurer: Ed Nicols. Executive Committee: L H S Jones, E Phillips, H C Caldecott, C Watson, G Langley, W A Lang, W J P Adendorff, J E de Wet, O Davis, S W Reynolds, B Pettigrew, G W Thomas, G H Bishop, H R Muir, M C Adendorff, W Napier, P Van Breda, Chriss Botha, G Templar.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: G C Mackenzie. Vice-Presidents: J C Watt, J.P., and R H Oellermann. Life Member: C A S Yonge, M.L.A. Secretary and Treasurer: W D Stewart, New Hanover. Auditor: J H F Hohls. Committee: W N Angus, E Bentley, W W Bentley, Edward Boast, E E Comins, G R Comins, C Crookes, jun, H Dinkelmann, J Duval, W Fortmann, Dr C H Herbert, J Hillermann, J H F Hohls, H Jacobson, H A Light, G C Mackenzie, A F Mackenzie, T M Mackenzie, J Muirhead, J.P., Oswald Muirhead, G Moe, J.P., J Moe, O Moe, C Oellermann, F Oellermann, C J Oellermann, W Ortmann, J C Otto, E Peckham, J.P., J A Potterill, S Peckham, C M Scott, Rev J Scott, Wm Schroeder, J.P., Owen Solomon, J H Smith, Riby Smith, F Thole, H Vorwerk, H F Westbrook, W H Westbrook, C Westbrook, T Wolhuter.

NOODSERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P. Vice-Presidents: H Mummbrauer, P Kodeshorst, W Dralle, W Wortmann. Committee: W Bartels, F Bosse, H Brannmer, A J Bruyns, H Bruyns, Carl Dralle, H Gebers, W Gevers, J H Holley, jun, W C Holley, C Hillermann, I Koel, H Kohler, F E Kuhn, M Maister, H Mereis, A Meyer, H Meyer-Estorf, H W Meyer, K A Meyer, H Misselhorn, W Misselhorn, K Peters, I Pfothenauer, G Rabe, G Reiche, Joh Reiche, W Rencken, H Rosenbrock, H Schmidt, K Schmidt, Rev Jas Scott, K Seele, F J Smith, J Thies, W Witthoft, P Worthmann, A Worthmann, F Worthmann, H Worthmann. Secretary: Paul Vietzen, P.O., Singletree. Hon Treasurer: E Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: B. Groene. Vice-President: Geo Ross. Secretary and Treasurer: H Singleton, Nottingham Road. Committee: J King, J C Parker, J J Morton, A Pearce, W Wood, C J King, A Mengens, K Soutar, W F Taylor, W A Dales.

PIETERMARITZBURGSCHE BOEREN VEREENIGING.—President: D P Boshoff. Secretary: E G Jansen, 313, Loop Street, Maritzburg.

POLELA AGRICULTURAL AND HORTICULTURAL SOCIETY.—President: J Isbister. Vice-Presidents: W H Allwright, J F Alexander, and H Brown. Hon. Secretary and Treasurer: J Anderson Speak. Auditor: A Brown. Executive Committee: J Isbister, W H Allwright, J F Alexander, H Brown, H J Gazzard, G W Foster, J Anderson Speak. Hall Committee: W H Allwright, F Crossley, A Brown, with the trustees—J F Alexander, H E Mingey, and Geo Forder.

QUDENI FARMERS' ASSOCIATION.—President: P E Tittlestad. Vice-President: W Calverley. Hon Secretary and Treasurer: E Tittlestad. Committee: H A Koch, S N Robbins, G M Anderson, B B Bunting, E Tittlestad.

RICHMOND AGRICULTURAL SOCIETY.—President: John Marwick. Vice-Presidents: W P Payn, J W T Marwick, C O and J W McKenzie and Chas Nicholson. Hon Treasurer: R Nicholson. Hon Secretary: Cecil Williams. Committee: Evan Harries, R A McKenzie, H M Moyes, Thos Marwick, J C Nicholson, J W Flett, A W Cooper, J.P., J W Hammond, C E Simes, Tom McCrystal, and the seven office-bearers (*ex-officio*).

RICHMOND ROAD FARMERS' ASSOCIATION.—President: Thos Stead, J.P. Vice-President: W Mapstone. Secretary and Treasurer: W L Stead, New Leeds, P.O. Committee: D Malcolm, J Mapstone, W P Payne, J James, J Sinclair, W S Crouch, H B Boyd, W Middleton, W Oldfield, T E Horwood.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G M Sutton, K.C.M.G. Vice-Presidents: W S Crart, Jas King, D C Dick, G J Macfarlane, C.M.G., O Hosking, with His Worship the Mayor, *ex officio*. Secretaries, Treasurers and Collectors: Duff, Eadie & Co, 12, Timber Street, Pietermaritzburg. Yard Superintendent: H J Stirton. General Committee: T J Allison, W H Buchanan, F G Burchell, W H Cobley, P H Campbell, R Comins, W P Gough, E S Goodwill, K H Hathorn, K.C., T W J Hall, J Hall, L Line, Col Sir D Mackenzie, K.C.M.G., Jas Morton, Sir T K Murray, Jno Moon, W J O'Brien, P Otto, R H Pepworth, J F Potterill, A Robinson, Rev J Scott, P D Simmons, H Solomon, W L Stead, H J Stirton, Dr Oddin Taylor, F W Jameson, S J Mason. Executive Committee: President, Vice-Presidents, and W J O'Brien, W H Cobley, K H Hathorn, K.C., and Col E M Greene. Members appointed by Corporation: Councillors Ireland, Sanders and Hathorn.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P J Kemp. Executive Committee: J J Uys, J Z Moolman, T J Botha, P J Viljoen, P J Kemp. Hon Secretary and Treasurer, Thys Uys, Utrecht P.O.

UMSINGA-BIGGARSBERG FARMERS' ASSOCIATION.—President: E C Nuss. Vice-President and Acting Secretary: Geo S Saunders, Helpmakaar.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T Menne. Vice-Presidents: Theunis J Nel, M.L.A., W J Slatter, W L'Estrange. Executive Committee: Tol Nel, A Newmarch, W Lilje, O Rotteher, S C Van Rooyen, W Newmarch, E J Van Rooyen, O Norton, I M Nel, J Bröwning. Managers of Show Yard: J M Handley and N Hunter. Hon Auditor: W K Ente. Secretary and Treasurer: W H Gibbs.

UMVOTI FARMERS' ASSOCIATION.—President: P R Botha (J's son). Vice-President: J M Handley. Secretary and Treasurer: G E Cadle (Box 6, Greytown). Auditor: J M Nel. Committee: W J Slatter, J G Nel, H F Torlage, R J Landsberg, A Newmarch, P H van Rooyen, A F Handley.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: W L Oldacre. Vice-President: G Langley. Hon Secretary: W F B Sutherland.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L Viljoen. Vice-Chairman: B H Breytenbach. Members: I Bierman, M M Knight, J H Klopper, B C Hattingh, T Botha, M Gregory, P L Uys, H P Breytenbach. Secretary: G J Shave.

UTRECHT BOEREN VEREENIGING.—President: D J A van der Spuy. Secretary: G J Shave, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut-Col F Addison. Vice-Presidents: Hon W F Clayton, M.L.A., W J Thompson Esq, J.P., E Saunders, M.L.A. Committee: Messrs R H Creighton, J Brown, H E Essery, A E Foss, J.P., A S L Hulett, J.P., J B Hulett, F R Potes, A S Knox, W Warren, F C Webb. Hon Secretary and Treasurer: H Curtis Smith (Stanger).

VRYHEID (WARD I) AGRICULTURAL SOCIETY.—President: E Dalton. Vice-President: J F Potgieter. Secretary: F Kolbe. Assistant Secretary: H Lombaard. Committee: Secretary, Assistant Secretary, and A von Levetzow, T Ries, P Grobler, F Molman, A Steenkamp.

WEENEN AGRICULTURAL SOCIETY.—President: Allan Stuart. Vice-Presidents: R Garland, R H Ralfe, F I de Waal. Hon Treasurer: F C Schiever. Hon Secretary: E Cautherley. Auditor: S Wolff. Executive Committee: Hon H D Winter, M.L.A., J W Moor, M.L.A., D W Mackay, T H Hidle and L L'Estrange. Manager of Show Yard: S Vaughan. Assistant: A Clouston.

WEENEN COUNTY HORTICULTURAL SOCIETY: Committee of Management: The President and Treasurer of the Weenen Agricultural Society and C J Offord, G W Linfoot, T J Nunn, Dr Brewitt, S Vaughan. Hon Secretary: F Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F W White. Vice-President: C E Symonds. Secretary: R H McAlister. Committee: Hon D C Uijs, A W Symonds, H T James, R J Ortlepp, J N R Dixon.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G H Hulett. Vice-President: C Hill. Hon Secretary and Treasurer: F Brammage, Ginginhlovu.

East Coast Fever Advisory Committees.

(NOTE.—Owing to sparse European population, the following Magisterial Divisions have no Advisory Boards: Ubombo, Mapumulo, Ingwavuma, Mahlabatini, Ndwandwe, Nkandhla and Hlabisa.)

ALEXANDRA.—Chairman: W Thompson, Umzinto. Members: H Bazley, R C Archibald, A Blamey, H Reynolds, G J Crookes, R Parkin, J A Curle.

ALFRED.—Chairman: Magistrate. Members: A G Prentice, Rev. S Aitcheson, J E Brown, F H Boddy, H M Raw, H Rethman, H C Hitchens, H J R Hatchwell, W P Bouscrie.

BERGVILLE.—Chairman: T E Zunckel, J.P., Bergville. Members: P H Van der Riet, J G Fannin, H Jackson, C Halferty, F Zunckel, Mbulali—Consulting member for natives.

BULWER.—Chairman: Magistrate. Members: R Comrie, Wm Colville, R Gordon, H Cole, P Garson, P McKenzie, G Malcolm, H C Gold, R Justice, E Stafford, W Little.

CAMPERDOWN.—Chairman: A N Kirkman, Cato Ridge. Members: J F Erfmann, P J Kingham, W B Turner, C J A Scheepers, W Mercer, L G Wingfield Stratford, J W Harvey, B B Evans, J W V Montgomery, B R Buchanan, W I Stead. **SUB-DIVISIONAL BOARDS.**—No. 1. *East of Railway Line from "Spitzkop" to Railway Line.*—Chairman: J F Erfmann, Cato Ridge. Members: P J Kingham, H Dinklemann, F L Meyer, J H Meyer, H A Meyer. No. 2. *East of Railway Line from West of Government Fence.*—Chairman: C J A Scheepers, Thornebylush. Members: W B Turner, W Mills, J F Scheepers, H Nadauld, G S Phipson. No. 3. *West of Railway Line from Koning Krantz to Killairney and along Umlaas River.*—Chairman: A N Kirkman, Clairmont. Members: W Mercer, W Brown, R Godfrey, W S Meyer, E W Meyer. No. 4. *West of Railway Line, west of Division between Main Line, Umlaas River Boundary of No 3.*—Chairman: W I Stead, Thoruville Junction. Members: F H Meyer, J R Schwegmann, W E Schwegmann, W S Crouch, B R Buchanan (Hon. Sec., Manderston). No. 5. *West of Main Line, Beaumont, East of Main Mid-Illovo River from Westley's Drift to Unguaranta River.*—Chairman: J W Harvey, Camperdown. Members: L G Wingfield Stratford, R Lyne, O A Hutton, E H Haycs, F E Groom. No. 6. *Mid-Illovo West of Line, rest of Division South of Umlaas River.*—Chairman: B P Evans. Members: J W V Montgomery, J H McCullough, J Ballam, J James, H S Power.

DUNDEE.—Chairman: F Turton, Glencoe Junction. Members: J Campbell, J J Grove, H Wiltshire, G M De Waal, Aug Jansen, A J Potgieter, A Cronje, A Schuid, H Greenhough. **SUB-DIVISIONAL BOARDS.**—*Glencoe Sub-area.*—Members: F Turton, H Greenhough, W H Miller, F Schroeder, V Marshall, J Lausen, J J De Jager, Rev Father Rauch (Native interests). *Hatting Spruit Sub-area.*—Members: J J Grove, H A J Davil, A E Norman, J Campbell, Rev J Dewar (Native interests). *East of Helpmakaar Road.*—Members: A M Cronji, D C Pieters, P Meyer, J A Naude, A Jansen. *West of Helpmakaar Road.*—Members: A J G Meyer, A P Lund, D C Uys, A J Van Tonder, Jun, A J Potgieter. Members of Joint Committee for Area West of Helpmakaar: A J Potgieter, A P Lund. Members of Joint Committee for Area East of Helpmakaar: A Jansen, A M Cronji. *Area between Main Vryheid Railway Lines.*—Members, W Craig, H Wiltshire, C M Meyer, Sen, A Spies, Jun, C M De Waal.

DURBAN BOROUGH.—Chairman: E L Acutt, Durban. Members: H R Bousfield, R Benningfield, G Swales, J Haynes, — Arthur.

EMTONJANENI.—Chairman: Magistrate. Members: F W Smith, H J James, F W White, A W Symmonds, R J Ortlepp, D C Uys, L J Van Rooyen.

ESHOWE.—Chairman: A Boast, Magistrate. Members: A Moore, G H Hulett, C F Adams, T Parkins, A T Wantink, F J Dickens, H H Thole.

ESTCOURT.—Ward 2. *East of Main Line.*—Chairman: A Stuart. Members: Magistrate, J Ralfe, J W Haw, J G Hatting, A Peniston, A B Haviland, G M Rudolph. Ward No. 3. (Boundaries): The Bergville Magisterial Division, Tugela

to junction of the two Tugelas; The Winterton Settlement fence to Vaai Plaats fence and Ovington and Sibhamie's Location fence, and from there to Government Game Reserve).—Chairman: H J De Waal, Glenisla. Members: R Gray, M Sanderson, R J Land, A Spearman, H L Bacon. *Ward No. 4* (Estcourt West of Railway Line; follow Bushman's River as far as Mr. Kerr's farm, then Nalaara's Location fence as far as Game Reserve).—Chairman: R H Ralfe. Members: F C Schiever, J Rencken, W Couch, P Male, T L Fyvie, J Hatting, A W J Hatting. *Ward No. 5* (Boundaries: Remainder of District West of Line).—Chairman: H Blaker, Estcourt. Members: W Comins, E B Griffin, H A Woodruffe, Col. Crompton, J Russell, A C Robinson, Jun, A E Downing, A D Shaw, J W Bentley.

GREYTOWN.—Chairman: Paul Hansmeyer, Greytown. Members: D Havemann, A Newmarch, J A Nel, W T Slatter, A T Handley, H S Botha. *Central Board*.—Chairman: P Hansmeyer, Greytown. Members: J A Nel, A Newmarch, W J S Newmarch, T K Taylor, S W Cadle, R J Van Rooyen, E J Van Rooyen, J G Nel.

INANDA.—Chairman: C R Bishop, J.P., Umgeni. Members: R Harrison, W Sykes, Jun, E Dore, W Campbell, R Armstrong.

KLIP RIVER.—*No. 1* (A line from Elands Laagte along the Matawaans and Jononos Kop to the Berg; North line, Dundee boundary: all West of Main Line).—Members: C Mitchell Innes, R M Gray, L Meyer, J C Henderson, C Allen. *No. 2* (O.R.C. line and boundary No. 1). Members: D Bester, A J Marais, W Allison, J Bester, — Brink. *No. 3* (From Klip River Bridge to Sand Spruit, and up Sand Spruit to its source in the Berg).—Members: H A Potgieter, A A Wetherell, B Nel, F Van Rooyen, H Portsmouth. *No. 4* (Rest of Division South and East of Sand Spruit and West of Main Line).—Members: W Leathern, H Illing, J H Newton, E Robinson, G W Willis. *No. 6* (Whole of Division East of Main Line).—Chairman: J G de Waal. Members: R A Smith, H Nicholson, P Cronje, J Farquhar.

KRANTZKOP.—Chairman: L L D Proksch, Krantzkop. Members: L M J Van Rooyen, L M J Van Rooyen, F E Van Rooyen, J H Van Rooyen, J P Zietsman, A Johnson.

IXOPO.—Chairman: Magistrate. Members: Thos Allen, Geo Martin, E Marriott, A Stone, G A Cooper, J.P., Wm Gray, D Campbell, F L Thring, J.P.

LION'S RIVER.—*No. 1* (Southern portion of West of Main Line).—Chairman: U K McKenzie, Lidgetton. Members: R J Spiers, F North, A McLean, J Morphew. *No. 2* (Northern portion West of Main Line).—Chairman: G Ross, Nottingham Road. Members: J Clouston, K Soutar, D Connel, D Smythe. *No. 3* (Southern portion East of Main Line).—J W Dicks, "Rosebank," Howick. Members: W M Henderson, — Buchanan, Jos Raw, H J McKenzie. *No. 4* (Northern portion East of Main Line).—Chairman: H Burgmann. Members: W Methley, G Hutchinson, J J Morton, B Taylor. (The whole of the members of the Sub-Divisional Boards constitute the Central Board with the Magistrate, Lion's River, as Chairman.)

LITTLE TUGELA, WARD 3.—Chairman: F J de Waal, J.P., Glenisla P.O. Members: R Gray, J.P., S Woods, W C Stockil, J.P., R J Lund, Geo Spearman, H L Bacon.

IMPENDHLE.—Chairman: T Fleming, Boston. Members: J Martens, P J Lourens, T Carter, C W Brooke, J W McLean, H Boike, C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell. *Sub-Committee appointed for Northern portion of Division* (added to Lion's River Division).—Chairman: P J Lourens, Insinga, via Nottingham Road. Members: H Boek, C N Brooke, T Carter, J Martens, J W McLean. *Sub-Committee for Southern portion of Impendhle*.—Chairman: T Fleming, Boston. Members: C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell.

LOWER TUGELA.—Members: W H B Addison, A E Jackson, H E Essery, A S L Hulett, J Brown, W O Robbins.

LOWER UMZINKULU.—Chairman: Col. J F Rethman, North Shepstone. Members: Col. J R Royston, D C Aitken, J.P., C H Mitchell, J.P., G P Beachcroft, Claude Manning, H Albers, N Harper, J S Clarke, A Borchard, T Stapleton, Col. Bru-de-Wold.

MOOI RIVER.—Chairman: W. G. Randles. Members: J. H. Wallace, H. F. Cadle, R. Garland, John Bartholomew, J. W. Johnstone, C. R. Skottowe, J. N. Boshoff, J. K. Lindsay.

MTUNZINI.—Chairman: Magistrate. Members: F Green, G M J Gielink, G Getkate, W Saville, A H Konigkramer.

NEWCASTLE.—No 1 (to be known as Charlestown-Ingogo District from main line of Railway where it strikes the Southern line of the farm Cloutant West, thence along Western boundary of said farm, thence along S. W. boundary of Tipperary West, thence Southern boundaries of Hamstead, Dumferline and Roodeport, thence along the Northern side of the Botha's Pass main road to where it joins the O.R.C. Boundary, thence along the boundary of the Colony, thence along the Charlestown Fence to where it joins the Railway line near Mount Prospect Gate, thence along the Railway line to Cloutant West).—Chairman: J Vos, Charlestown I.O. Members: W J Adendorff, A J Johnstone, A Paine, A H Trouw, Angus Wood. No. 2 (Newcastle district Southern boundary of No. 1 along Railway line from Cloutant West, including portion of Town Lands, Newcastle, which by agreement with Government is considered to be West of line, thence along Railway line where it strikes the Southern boundary of the farm Kopjeallen, thence along Southern boundaries of Kopjeallen, The Gardens, and Lincoln to the Ingagane River, thence up the Ingagane up to the farm Falixtowe, along Southern boundaries of Falixtowe, Bawerton, Brooklyn, Stonehenge, Tathamscamp, Hanover, Ellensdale, Endsels, Bejuisel, Stelazies Kop, Mount Blanc, to O.R.C. border fence, thence along O.R.C. boundary joining Southern boundary of No. 1 at Botha's Pass).—Chairman: S W Reynolds. Members: F A R Johnstone, W Moller, J.P., L H S Jones, C Earl, F Meyer, J J Muller, — Van Breda, J Macdonald, J C Adendorff, E Sanders. No. 3. *Dannhauser District* (Bounded by Southern District No. 2 from the Railway line at Kopjeallen to the Berg, thence along O.R.C. border, the boundary between Newcastle and Klip River Divisions, thence along the Railway line to the farm Kopjeallen).—Chairman: W L Oldacre. *Dannhauser*. Members: Geo Friend, B Harrington, L J Muller, J Ecksteen, E Hodson, W Watson, Ted Twyman, G Langley, Don Urquhart. No. 4 (East of Railway Line, along the boundary between Newcastle and Dundee Divisions from the Railway Line near Dannhauser to the Buffalo River, along the Buffalo River to the junction of the Ingagane, thence along the Ingagane to its junction with the Incaander, thence along the Incaander to the fence of the Newcastle Town Lands, known as the Eastern boundary of the Railway Line, thence along the Eastern side of the Railway Line to the Magisterial Division boundary near Dannhauser).—Chairman: T K Boshoff, *Dannhauser*. Members: J H Potgieter, H Miller, J H van der Westerhuizen, J J Kemp, W Dicks, C Uys. No. 5 (the strip of land lying between the Railway Line and the Buffalo River from the Ingagane and Incaander streams, which form the North-Western boundary of No. 4 district).—Chairman: E W Noyce, Boscobello P.O.; members, Geo Matthews, T K Panzera. *Central Board*.—Chairman: S W Reynolds, Newcastle. Members: F A R Johnstone, J Vos, Sen, Angus Wood, W Oldacre, W Watson, E W Noyce, F N Panzera, T R Boshoff, J H van der Westhuizen.

NEW HANOVER.—Central Board. Chairman: E Newmarch. Members: W W Bentley, T C Wolluter, F Reiche, H Schmidt, E Lindhorst, W L'Estrange, A F McKenzie, W Meyer. *New Hanover Sub-Committee*.—Chairman: E Newmarch. Members: Jno Moe, W W Bentley, W Ortmann, T C Wolluter, O J Muirhead. *Dalton Sub-Committee*.—Chairman: W L'Estrange. Members: A F McKenzie, R W Smith, G Reddinger, H Rosenbrock, J H Gordon, W Meyer. *Schroeders Sub-Committee*.—Chairman: F Reiche. Members: H Schmidt, E Lindhorst, G Moe, P Rodehorst, H T Rohrs, F Gorden, A Meyer, W Fortmann.

NQUTU.—Chairman: A Barklie, Utrecht. Members: H Wilkins, R L Flindt, W A Westbrook, J W F Hall, Dr. Knight.

PAULPIETERSBURG.—Chairman: N J Els, Viljoen's Rust. Members: J B Eudolph, G J Combrink, A Schutte, A Bester, P H van Rooyen.

PIETERMARITZBURG.—Chairman: B Swete Kelly, Pietermaritzburg. Members: W S Cratt, C A Fawcett, W E Goodwin, E G McAlister, E E Hodgson.

RICHMOND.—Chairman: Magistrate. Members: E E Johnson, J Mapstone, G D Alexander, C P Lewis, C Nicholson, W Comrie, John Marwick, W P Payn, A H Cockburn. *Sub-Division No. 2*.—Chairman: G D Alexander, Nel's Rust. *Sub-Division No. 5*.—Chairman: W Oldfield, Fox Hill.

REIT VLEI DISTRICT.—Chairman: D. E. Muir, J.P., Elsmore. Mooi River. Members: P. Otto, J.P., R. J. Van Rooyen, E. J. Van Rooyen, J. G. Nel, A. Kohrs, J. Hooper, Otto Norton (Hon. Secretary).

SEVEN OAKS DISTRICT.—Chairman: W J S Newmarch, Harden Heights. Members: H M Balding, J.P., J Crow, J T Martens, H Mayne, S W Cadle.

UMGENI DIVISION.—Chairman: E. S. Goodwill. Members: F. Schreenn, B. Crompton, C. Arnold, R. J. Potts, A. J. Tyler, F. J. Smith, A. Wood, J. P. Symonds, J. J. Potterill, W. H. Keytel, C. Lund.

UMLAZI.—Chairman: C Henwood, Durban. Members: W Pearcer, W Gillett, H Freese, L Jackson, P W Mackenzie.

UMSINGA.—*No. 1 District* (All farms lying West of the Umsinga-Helpmakaar main road).—Chairman: E C Nuss. Members: W W Strydon, J.P., J H Nuss. *No. 2 District*—(All farmers East of the Umsinga-Helpmakaar main road—excepting the farms Sutherland, Gordon, Memorial Mission and Pomeroy Town Lands, and Location lying North of the Mazabeko and West of the Buffalo River. —Chairman: W H Wholberg, P.O. Elandskraal. Members: H W Dedekind, J Dedekind. *No. 3 District*—(The remaining portion of the area lying in the Umsinga Division).—Chairman: A Muller. Members: M J Matheson, H Muller. The three Committees to constitute the joint Committee.

VRYHEID.—Chairman: A von Levetzow, Vryheid. Members: P Labuschagne, B E A Rabe, G M van der Westhuizen, J Kruger, J F Potgieter, L M N Nel.

WEENEN.—Chairman: C G Jackson, Weenen. Members: C Harding, J.P., P J van Rooyen, J.P., K Rotteher, S B Buys, J J Vermaak, L C Kinsman, J W A Pole, C F Vermaak, P R Buys, J C's son.

Publications Issued by the Department of Agriculture.

THE following publications, issued by the Department of Agriculture, are still in print, and copies may be obtained free (except those with price attached) upon application to the office of the *Agricultural Journal*, Department of Agriculture, Pietermaritzburg. The figures in square brackets (c.g. [1904]) are the years in which the various publications were issued.

No.

BULLETINS.

- 2.—“Manures on the Natal Market, 1902,” by Alex. Pardy, F.C.S., Analyst. [1902.]
- 4.—“Manures on the Natal Market, 1903,” by Alex. Pardy, F.C.S., Analyst. [1903.]
- 6.—“Manures on the Natal Market, 1904,” by Alex. Pardy, F.C.S., Analyst. [1904.]
- 7.—“Tree-planting in Natal,” by T. R. Sim, F.L.S., Conservator of Forests. [1905.]
(Price 2s. 6d., post free.)
- 8.—“Agricultural Co-operation,” by E. T. Mullens, Secretary, Minister of Agriculture. [1905.]
- 10.—“Manures on the Natal Market, 1905,” by Alex. Pardy, F.C.S., Analyst. [1905.]
- 11.—“East Coast Fever,” by S. B. Woollatt, Principal Veterinary Surgeon. [1906.]
- 12.—“Manures on the Natal Market, 1906,” by Alex. Pardy, F.C.S., Analyst. [1906.]
- 13.—“Report on the Disease known as ‘Bluetongue’ in Sheep,” by H. Watkins Pitchford, F.R.C.V.S., F.R.S.E., Govt. Bacteriologist and Director, Govt. Laboratory. [1908]
- 14.—“Poultry-Keeping in a Simplified Edition for Farmers,” by F.C. [1908.]
- 15.—“The Export of Citrus Fruit,” by Claude Fuller. [1909.]
- 16.—“Some Common Bagworms and Basketworms,” by Claude Fuller. [1909.]
- 17.—“Dipping and Tick-Destroying Agents,” by H. Watkins Pitchford, F.R.C.V.S., F.R.S.E., Govt. Bacteriologist and Director, Govt. Laboratory. [1909.]

REPORTS.

Annual Report of the Agricultural Department, 1902. (Includes Reports of the Director of Agriculture, Entomologist, Conservator of Forests, Dairy Expert, Editor *Agricultural Journal*, etc.) [1903.]

Report of the Secretary, Minister of Agriculture: January 1, 1903, to June 30, 1904. [1905.]

Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1905. [1905.]

Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1906. [1906.]

(For a continuation of the statistics given in these reports see reprint "Natal's Progress in 1906," noted below.)

Fourth Report of the Government Entomologist: 1903-4. [1905.]

Fifth Report of the Government Entomologist: 1904-5. [1906.]

Sixth Report of the Government Entomologist: 1905-6. [1907.]

(The Third Report of the Entomologist is included in the "Report of the Agricultural Department, 1902," noted above.)

Report of the Conservator of Forests, 1902. [1903.]

Interim Report of the Conservator of Forests up to December 31, 1905.

Report of the Principal Veterinary Surgeon, for year ended 30th June, 1906. [1907.]

First Annual Report of the Land Board, 1905. [1906.]

Annual Report of the Land Board, 1906-7.

MISCELLANEOUS REPRINTS, ETC.

Black Spot ("Letter Book Pages": reprinted from *Journal*.)

Mealie Grubs (do do)

Mosquitoes (do do)

Woolly Aphis (do do)

Cotton. By A. N. Pearson, Director, A. E. & C. (Reprinted from *Journal*: 1904.)

Co-operation. By E. T. Mullens, Secretary, Minister of Agriculture. (Reprinted from *Journal*: 1907.)

Citrus Fruit Export. (Reprinted from *Journal*: 1907.)

Natal's Progress in 1906. (Reprinted from *Journal*: 1907.) The statistics contained in this paper are on the same lines as those in the Annual Reports for previous years of the Secretary, Minister of Agriculture.

Natal's Progress in 1907. By H. J. Choles, F.S.S. (Reprinted from *Journal*: 1908.)

Fibre Cultivation. (Reprinted from *Journal*: 1907.) This paper is a summary of Bulletin No. 13 of the Department of the Interior, Bureau of Agriculture, Manila.

Sisal, Mauritius Hemp and other "Aloe" Fibres. By T. R. Sim, F.L.S., Conservator of Forests. (Reprinted from *Journal*: 1907.)

The Fibre Industry of Mauritius. By Leonard Acutt, J.P., Tongaat; Member of the Land Board, Natal. (Reprinted from *Journal*: 1907.)

South African Products Exhibition, 1907. Report of T. R. Sim on the Natal Exhibits. (Reprinted from *Journal*: 1907.)

Poplar Timber for the Local Manufacture of Matchea. By E. R. Sawyer, Director, E.S. (Reprinted from *Journal*: 1908.)

Agricultural Industries and Land Settlement in Natal. [1907.]

Judging Fruit, Flowers, Plants and Vegetables at Shows. By T. R. Sim, F.L.S., Conservator of Forests. [1906.]

Agricultural Statistics, Natal, 1905-6. [1907.]

Model Rules for Agricultural Co-operative Societies. (Price 1s., post free.)

Government Cold Stores and Abattoirs.**PIETERMARITZBURG.**

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

	Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
			Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300 lbs. weight.	Over 300 lbs. weight.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1. Receiving per head	0 3	0 6	0 6	0 6	0 3	0 3
2. Killing and Cleaning	2 3	3 6	2 9	3 3	2 6	3 0
3. Labour	0 3	0 6	0 3	0 6	0 3	0 6
4. Disinfectants	0 1	0 1	0 1	0 1	0 1	0 1
5. Bagging (4 Quarters) ... per body	1 9	3 0	2 6	2 9	2 3	2 6
6. Cleaning of Tripes ... each	0 6	0 6	0 6	0 6	0 6	0 6
7. Chilling of Beef, up to 72 hours or portion thereof per body	1 0	2 9	2 0	2 6	1 9	2 6
8. Chilling of Offal, up to 72 hours or portion thereof per set	1 0	1 0	1 0	1 0	1 0	1 0
Chilling and Freezing Beef—						
9. 1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9
10. 2nd " " " " "	1 0	4 0	3 3	3 6	3 3	3 3
11. 3rd and remaining weeks or portions thereof	0 8	3 0	3 0	3 0	3 0	3 0
Chilling and Freezing Offal—						
12. 1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4
13. 2nd " " " " "	1 0	1 3	1 0	1 0	1 0	1 0
14. 3rd and remaining weeks or portions thereof	0 9	1 0	0 9	0 9	0 9	0 9

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars apply to the Manager, Government Cold Stores.
Department of Agriculture, Maritzburg, 21st December, 1908.

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the Fund, Colonial Offices, Pietermaritzburg.

All Correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

NATAL GOVERNMENT RAILWAYS.

RATE FOR SOUTH AFRICAN MANGOES FOR EXPORT OVERSEA BEYOND SOUTH AFRICA.

With effect from this date South African Mangoes consigned from N.G.R. and certain C.S.A.R. Stations to Point, for export oversea beyond South Africa, will be conveyed at the same rates and under the same conditions as South African Citrus Fruit so exported.

Maritzburg, January 4th, 1910.

TEMPORARILY REDUCED RATES FOR THE CONVEYANCE BETWEEN N.G.R. STATIONS OF CEMENT USED IN THE CONSTRUCTION OF DIPPING TANKS.

With effect from 5th January, 1910, and as a temporary measure for a period of six months, a rebate of the difference between the amount paid at the Intermediate "B" rate and charges at the No. 11 rate will be granted on Cement conveyed between N.G.R. Stations for use in the Construction of Dipping Tanks, provided the following conditions are complied with:—

- (1) The consignor must declare on the Consignment Note that the cement is to be used in the Construction of Dipping Tanks.
- (2) When applying for rebate the consignee must produce a certificate to the effect that the cement has been actually used in the Construction of Dipping Tanks.
- (3) The traffic is "Station to Station," Owner's Risk.
- (4) The rebate will be granted only when the cement is conveyed in consignments of not less than 1 ton.

General Manager's Office,
Maritzburg, 30th December, 1909.

HEDLEY SALMON,
Acting General Manager.

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„ ORANGE RIVER COLONY	E. J. MACMILLAN, Government Buildings, Bloemfontein.

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THRESHING WHEAT AND BARLEY STRAW AT WEENEN.

*The Natal Agricultural Journal.****Natal's Trade in 1909.***

WE have received from the S.A. Customs Statistical Bureau in Capetown the monthly returns for December, 1909, of trade and shipping in Natal. These December returns are of particular importance, enabling us to study the trade of the twelve months which they bring to a close, since they include summaries for the whole year; and with the returns which we have received before us we propose to direct our readers' attention to the main points noticeable in the trade of 1909.

A very noticeable expansion is to be observed in practically all branches of trade where such expansion is desirable. By this we mean, for instance, that whilst there have been lessened imports of articles of food and drink during the twelve months, as compared with the previous year, in all other categories except imports of living animals desirable expansions are noticeable. Last year we had to note, in our usual review of trade, lessened spending powers in respect of the year 1908 as compared with the previous twelve months; this year we find indications of increased spending powers once more; and taking all the returns as a whole all the leading features of them are satisfactory.

Dividing imports into five general classes, as usual—I., Living Animals; II., Articles of Food and Drink; III., Raw Materials and Articles mainly Unmanufactured; IV., Manufactured Articles; and V., Articles Imported Oversea through the Post—we find that they compare with those of 1908 as follows:—

VALUE OF MERCHANDISE IMPORTED (OVERSEA) IN 1908 AND 1909.

	1909.	1908.
I. Living Animals	26,599	27,519
II. Articles of Food and Drink ..	1,521,262	1,813,095
III. Raw Materials, etc.	656,347	518,349
IV. Manufactured Articles	4,931,406	4,081,495

Last year, in drawing up a similar statement in respect of 1907 and 1908, we found that there was a shrinkage in every class, but it is pleasing on this occasion to note that the imports of raw materials, etc., and manufactured articles were considerably larger last year than in 1908,

whilst the imports of articles of food and drink were smaller by nearly £300,000. The increases in categories III. and IV. are unmistakable signs of increased spending powers on the part of the general population (itself an indication of a more prosperous state of things) and increased industrial activity; the decrease in the imports of articles of food and drink is also to be regarded as a healthy sign in a country such as ours. This class of imports has an especial interest for readers of the *Journal*, and we may accordingly proceed to make somewhat of a detailed examination of some of the most striking changes which are noticeable in

IMPORTS OF ARTICLES OF FOOD AND DRINK.

Statement showing the Quantities and Value of the Articles of Food and Drink Imported into Natal during the Year 1909, as compared with the previous Year.

ARTICLES.	1909.		1908.	
	Quantity.	Value.	Quantity.	Value.
Ale and Beer galls.	57,717	11,006	65,557	12,986
Bacon and Hams lbs.	1,903,465	68,684	2,312,250	74,570
Biscuits and Cakes lbs.	450,153	13,735	757,112	17,954
Butter, &c. :				
Butter lbs.	2,297,944	113,616	4,019,538	210,805
Margarine and other Substitutes lbs.	895,252	26,528	682,893	30,043
Cheese lbs.	1,428,636	38,431	1,593,317	43,126
Chicory lbs.	583,355	4,779	392,147	3,156
Coffee :				
Raw lbs.	2,959,412	52,343	2,858,784	46,758
Roasted and Ground lbs.	37,700	1,153	24,726	810
Confectionery of all kinds (N.O.D.) lbs.	1,089,130	46,018	1,069,311	45,061
Corn, Grain, and Flour :				
Maize lbs.	16,138	77	1,495	9
Wheat lbs.	12,416,781	45,996	12,718,739	49,387
Wheaten Flour lbs.	48,595,634	227,979	47,014,303	218,205
Other kinds lbs.	9,746,568	46,957	9,935,365	53,079
Eggs No.	818,572	3,702	1,425,026	5,820
Fish : Fresh lbs.	3,859	124	4,433	184
Dried and Preserved lbs.	2,874,663	57,684	2,794,900	57,660
Fruits : Fresh, including Nuts		10,942		29,261
Dried and Preserved (except Dates) lbs.	1,068,573	15,913	1,072,686	17,281
Jams and Jellies lbs.	667,990	10,611	760,911	12,538
Lard lbs.	470,873	11,023	483,261	10,628
Meats : Fresh or Frozen lbs.	5,499,917	57,531	17,688,309	181,190
Tinned or otherwise preserved lbs.	525,384	18,521	579,452	19,547
Milk, condensed lbs.	3,797,744	64,887	4,239,744	72,197
Oatmeal and other Farinaceous Foods lbs.	1,939,800	23,547	2,267,183	26,380
Rice lbs.	40,388,437	160,885	38,426,703	186,319
Spirits, potable galls.	359,847	148,614	343,192	137,290
Sugar of all kinds lbs.	3,735,622	24,275	7,551,067	44,371
Sugar Products lbs.	1,523,255	12,783	7,756,673	14,279
Tea lbs.	1,408,715	62,377	1,589,690	70,895
Vegetables : Potatoes lbs.	3,094,839	8,971	2,748,550	8,182
Fresh (N.O.D.) lbs.	752,915	2,545	826,383	3,168
Bottled or Tinned lbs.	412,586	6,192	472,495	6,604
Wines of all sorts galls.	32,112	25,641	26,466	20,081
Other Articles of Food and Drink (N.O.D.)		97,233		92,271
Total		1,521,262		1,813,095

this class. We give a full table of the imports of articles of food and drink, comparing the figures of 1909 with those of 1908, from which it will be observed that with few exceptions Natal imported less of each of the various commodities enumerated. There are, however, among the exceptions two or three to which we must make a special reference. The most important of these is perhaps potatoes. The increase over 1908 is, approximately, 300,000 lbs., but whilst this increase is not, perhaps, such a very large one, what renders it of greater importance is the fact that in 1908 there was also an increase over 1907—an increase that was equivalent to over 46 per cent. As we remarked last year, it is disgraceful enough to ourselves as farmers that the Colony should be importing such large quantities of potatoes at all, but it is even more so that the imports should be on the increase. The only redeeming feature about the situation is the fact that the percentage of increase was less last year over 1908 as compared with 1908 over 1907, but this fact does not afford much consolation when we contemplate the fact that the imports of this product now stand at over three million pounds per annum. The next commodity in respect of which an increased importation is noted is chicory. We have been told that farmers do not care to go in for chicory because there is no market for it, and yet we observe that the imports, which were £3,156 in value in 1908, increased to £1,799 in 1909. These figures speak for themselves. Mr. Turner, of Durban, has for years past been urging the farmers of this Colony to take up the cultivation of chicory, since—so we understand—he is open to take considerable quantities of the root for use in his factory, and he has even gone so far as to publish articles in the *Journal* and in the daily press giving instructions for preparing the land, sowing, cultivation, and hints as to the general care required by the crop. His efforts, whilst they have resulted in a few farmers taking up the cultivation of this crop, have not met with the success they deserve. Perhaps the figures we have quoted above, showing that a comparatively large market exists here, will induce others of our farmers to give serious attention to the matter and to write to Mr. Turner and ascertain what returns they may expect from the crop. In passing, we may also note that 16,000 lbs. of maize were imported last year from overseas, as compared with 1,400 lbs. for 1908. These are not figures to grow alarmed over, but that they should appear at all in the returns seems strange in a maize-exporting country. It will be seen that the imports of rice are considerable, and the magnitude of the figures makes one regret the fact that so far apparently no successful results have been obtained in Natal in the cultivation of rice on a large scale. We know of no reason why some of the upland varieties should not succeed here, and it may be that failures in cases where attempts have been made on a commercial scale have been due to ignorance of the requirements of the crop in respect of both climate and cultivation. We notice that the imports of flour

have increased by a million and a half pounds, whilst the imports of wheat, which in 1908 had increased by one hundred and thirty per cent. over 1907, decreased last year by 300,000 lbs. At the same time, however, the situation which we commented upon last year has suffered very little change. Last year, in reviewing the trade of Natal in 1908, we noted an increase of 130 per cent. in the imports of wheat in that year over the imports for 1907 and a decrease of 22 per cent. in the imports of wheaten flour, and in respect of these changes we commented as follows:—“As regards the imports of wheat, the increases are a matter for congratulation than otherwise. It will be many years before South Africa will be in a position to fulfil her wheat requirements, and in the meantime we are compelled to import our bread-stuffs. The increase in the imports of wheat should be read in connection with the decrease in the imports of wheaten flour, for in these figures we have an indication of the progress which local milling is making. We are thus building up a large local industry, which supplies us with our flour from imported grain instead of importing flour that has been ground oversea.” As we have said, the changes last year were so small as not to effect the situation as we commented upon last year. One further item in our imports we should like to refer to before we pass on. This is the imports of meat. In 1907 we imported 40,655,363 lbs.; in 1908 our imports sank to 17,688,309 lbs.; in 1909 our imports were 5,490,917 lbs. We could hardly expect anything more satisfactory than this, and these decreases serve as a very interesting sign of the times.

We may now proceed to examine the figures relative to the exports of S.A. produce from Natal. In this section also there are increases to be noted. In the first place, we find that commodities other than gold to the extent of £2,677,584 were exported in 1909, as compared with £1,942,567 in 1908, which is a notable increase. Among the commodities for which increases are shown mention may be made of bark, maize, fruit, mohair, hides and skins, whale oil and wool, all of which show noteworthy increases. The value of maize exports from Natal has increased from £163,500 in 1908 to £420,780 in 1909. Of course much of this maize was produced by the O.R.C. and the Transvaal, and the same remark applies to other commodities exported. In wool in the grease we find an increase of nearly six million pounds weight; and the exports of hides and skins have increased from £145,858 in 1908 to £256,283 in value in 1909.

Our exports of South African produce to other States of the S.A. Customs Union amounted to £2,166,133 in value last year, as compared with £1,868,537 in the previous year, £1,538,126 in 1907, and £1,497,166 in 1906. The significance of these figures is shown in the following statement, which also includes figures relative to oversea exports of S.A. produce in the same years:—

EXPORTS OF SOUTH AFRICAN PRODUCE FROM NATAL.

		1906.	1907.	1908.	1909.
		£	£	£	£
Oversea		1,181,808	1,762,684	1,942,567	2,677,584
S.A.		1,497,166	1,538,126	1,868,537	2,166,133
Totals		2,678,974	3,300,810	3,811,104	4,843,717

In the accompanying table we give details of the quantities and values of S.A. produce exported during 1909, with the figures for 1908 for comparison.

EXPORTS OF SOUTH AFRICAN PRODUCE OVERSEA.

Statement showing the Quantities of South African Products Exported Oversea from Natal during the Year 1909, as compared with the previous Year.

ARTICLES.				1909.		1908.	
				Quantity.	Value.	Quantity.	Value.
					£		£
Animals, living	Horses	...	No.	25	523	26	535
"	All other	...	...	...	558	...	811
Bark	"	...	lbs.	79 055 032	192 950	55,075,787	133 509
Coal, Bunker	"	Tons of 2,000	lbs.	873 290	621,818	709 976	572,407
"	Cargo	"	"	191,561	134,842	201,098	142,263
Corn, Grain and Meal, Maize	"	...	lbs.	192 491,741	429,780	73,121,926	163 500
"	All Other	...	lbs.	1,393,837	3 280	2,540,215	5,747
Fodder and Forage	"	...	lbs.	3 967 621	7,547	5 323,642	10 004
Fruit, Fresh and Dried	"	...	...	...	5,354	...	2,117
Hair, Angora	"	...	lbs.	1,328 969	52,569	1 319 936	47,375
Hides and Skins :							
Hides, Ox and Cow	...	...	lbs.	7 738 089	197 287	5,533,625	110 673
Skins, Goat	...	...	lbs.	133,549	2,413	111,198	1 364
" Sheep	...	...	lbs.	2 504 154	56,583	1,582,803	27,821
Matches	...	...	gross	4 688	648	4 951	795
Oil, Whale	...	...	galls.	154,683	9 493	110,369	8,853
Soap, Common	...	...	lbs.	95 378	1 051	369 719	3 598
Spirits of all sorts	...	...	galls.	216 860	6 998	221,094	9 602
Sugar	...	...	lbs.	318,221	1,158	588 251	2,438
Tea	...	...	lbs.	136,495	4 512	276 558	9 364
Tobacco	...	...	lbs.	23,682	696	9 802	525
Wool, Sheep (scoured and washed)	...	...	lbs.	501,263	24 804	543,138	32 828
" (in the grease)	...	...	lbs.	29 480,479	882 204	23,574,042	620,652
Other Articles of S.A. Produce	...	...	...	...	49,417	...	23 846
Total	...	...	...	...	2,677,584	...	1,942,567
Gold, Raw*	...	...	ozs.	295,587	1,101,374	265,416	9,994 566
" Concentrates*	...	...	ozs.	...	8,802	...	17,841
Grand Total	...	...	...	...	3,787,760	...	1,954 974

*Produce of the Transvaal.

From the comparative table of shipping, we notice that the total tonnage of cargo landed during 1909 was 547,569 tons, as compared with 436,651 tons in 1908, and 479,482 tons in 1907; while last year 660,939 tons of cargo were shipped, as against 608,073 tons in 1908—a further sign that we are exporting more.

Altogether, the Customs Bureau has presented us with a very satisfactory statement of the Colony's trade, and we can only hope that the general increases which have been the feature of last year's trade, as compared with the trade of 1908, may be maintained in the future.



The Maize Crop.

As we stated in our MARKETS AND CROPS Supplement last month, we have made arrangements with a number of prominent farmers in all parts of the Colony to be supplied with reports every month on the condition of the maize crop from the beginning of the year until harvest-time, in accordance with our usual custom; and we are also compiling data with regard to the area under crop this season. For the latter purpose we despatched, at the beginning of the year, forms to every farmer in the country, and these are being compiled as they come to hand. At the time of writing about two-thirds have come to hand, so that we should be able, in our next issue, to present our readers with the results of this census and also to give an estimate of the probable crop this year. Without a fairly accurate idea of the area planted, we cannot, of course, make any forecast of the probable extent of the crop. This estimate we shall revise each month in the light of our correspondents' reports.

In the schedule with which we supply our correspondents for the purpose of reporting upon the condition of the crop each month we ask to be informed as to whether the condition of the crop at the end of the month is "Poor," "Fair," "Average," or "Above the Average"; and in calculating these reports we use the figures 1, 2, 3, and 4, respectively, to represent those conditions. As we have a large number of correspondents in each district the average of the reports should present a very good idea of the general condition of the crop; and by using decimals in conjunction with the above figures we are able to strike an average with ease. Thus the figure 1.5 means a condition of a crop which cannot be described as "poor," but which, on the other hand, is not good enough to be described as "fair"; in other words, it is a condition midway between "poor" and "fair." From the reports, then, which we have received we find that the *average* condition of the maize crop, taking the Colony as a whole, on the 31st January was 2.0 or "Fair," which represents a probable crop of $3\frac{1}{2}$ muids to the acre.

The condition of the crop in each of the Magisterial Divisions of the Colony at the end of last month was as follows (remembering that the figure 1 represents a condition which would be described as "poor," 2 stands for "fair," 3 for "average," and 4 for "above the average," intermediate figures standing for corresponding intermediate conditions):—Lower Umzimkulu, 3·2; Alexandra, 2·5; Umlazi, 3·0; Inanda, 3·2; Lower Tugela, 2·4; Impendhle, 1·0; Alfred, 2·5; Ixopo, 2·7; Richmond, 2·2; Umgeni, 2·4; Lion's River, 1·8; Umvoti, 2·2; Krantzkop, 2·8; Underberg, 1·0; Polela, 1·0; Bergville, 1·8; Estcourt, 1·9; Weenen, 1·6; Klip River, 2·0; Umsinga, 2·6; Dundee, 2·2; Newcastle, 2·2; Vryheid and Ngotshe, 2·6; Utrecht, 2·5; Paulpietersberg, 4·0; Babanango, 3·0; Eshowe, 2·5; and Emtongjaneni, 3·0. Of course, it should be understood that these figures, and in fact all the calculations which we shall make this season (unless otherwise stated) refer only to crops grown by European farmers, it being impossible to form any idea as to the extent or general conditions of the Natives' crops at this early stage.

A New Method of Packing Pines.

Persons interested in the export of pineapples and in their transit for considerable distances generally will be pleased to hear that an ingenious device in connection with the packing of pines has been invented by Mr. W. Merritt, whose name is doubtless well known to readers of the *Journal* in connection with the manufacture of dried blood fertiliser. Boxes of various sizes can be used to suit the size of the pines and the number desired to be packed in each box. The box has either an ordinary bottom or else two or more battens (in which latter case, naturally, the weight of the box will be somewhat reduced). The bottom or battens, as the case may be, has a series of holes bored a certain distance into the wood, the distance between the holes (which are, of course, placed in lines) is governed by the size of the fruit. In each hole a specially prepared compound (of which Mr. Merritt has the secret) is placed for the purpose of sealing the stem of the pine when it is inserted in the hole—the pines being cut with a short piece of the stem attached for the purpose. By inserting the stems of the pines into the holes, which have already been filled with the composition, the fruit is held in position and sealed by this composition, and is thus prevented from "weeping" or "bleeding." Each pine stands in a vertical position, and the fruits are prevented from swaying to either side by means of thin laths run lengthways and breadthways between the fruit; this forms a square enclosure around the crown of each pine. A little packing of wood-wool or any other suitable substance is then placed wherever needed in order to help to keep the pines steady. The box should be made of battens or laths in order to provide spaces for the free circulation of air around the fruit.

Correction.

Mr. Allan H. Winter, "Loch Sloy," Estcourt, writes as follows to the Chief of the Veterinary Division (Mr. W. M. Power):—"I notice in your return of outbreaks of East Coast Fever, published in the *Agricultural Journal*, January number, you include the farm 'Loch Sloy.' Please correct this; the only outbreaks of East Coast Fever amongst cattle of H. D. Winter have been on the farm 'Clifton.'" The error was due to the fact that, in forwarding blood slides, Mr. Winter did not state they were from the farm "Clifton," the letter being dated at "Loch Sloy."

Where Ostriches can be Obtained.

The name of Mr. J. A. Viljoen, of "Stillwater," Vryheid, will be familiar to many of the readers of the *Journal*, and the "interview" with him by our Travelling Commissioner, which appeared in the *Journal* some months ago will doubtless be remembered. Those who read the "interview" in question will remember that one of the subjects in which Mr. Viljoen was particularly interested at the time of the interview was ostrich farming. During the past month we have been favoured by a visit from Mr. Viljoen. He tells us that the publication of the "interview" in question in the *Journal* resulted in his receiving a large number of enquiries from farmers in Natal interested in ostrich farming, and partly as a result, Mr. Viljoen has completed arrangements whereby he will be in a position to supply young ostriches as well as breeding birds to those requiring them at reasonable prices; and he will also be glad to give hints on the rearing and care of birds to purchasers. Mr. J. Raw and Co., of Maritzburg, are acting in conjunction with Mr. Viljoen, and they will be glad to answer any enquiry for birds. This is a good opportunity for those who are thinking of going in for this branch of live stock, and readers can rest assured, Mr. Viljoen tells us, that they will get good birds, since all birds passing through his hands will be carefully selected by an expert in Cape Colony.

In the course of a chat with Mr. Viljoen on ostrich-farming generally and the prospects of its development in Natal, he informed us that there are considerable areas in Natal in which ostriches would do well, and he instanced particularly the Thorns. He mentioned that ostriches require a dry climate, but that heat does not affect them, and for this reason he does not think that they would do altogether well in the somewhat humid atmosphere of the Coast Belt. As regards the question of lucerne, Mr. Viljoen remarked that Cape farmers certainly swear by this crop, but he said that the reason why lucerne was so extensively grown for ostriches in the Old Colony was that it is practically the only green crop which will grow satisfactorily so far as the purposes of the ostrich

farmer are concerned. He remarked that we in this Colony can grow other crops which will provide the necessary green stuff, and he added that, whilst lucerne is certainly a convenient crop to grow—on farms where it will thrive—and it is very desirable and so has its advantages, at the same time farmers in this Colony who propose going in for ostrich-farming but who are doubtful as to whether lucerne will grow satisfactorily on their farms, need not be anxious about the lucerne question if they can raise some other crop to take its place. We have already on previous occasions published articles in the *Journal* on ostrich-farming, to which we would refer readers who may be seeking information, whilst, as we have said, Mr. Viljoen himself will be pleased to answer any inquiries from intending purchasers.

“The Cedara Record.”

We have this month to welcome a new addition to the periodical literature of the Colony in the form of the first issue of the *Cedara Record*. This magazine is, of course, the organ of the School of Agriculture and Forestry, and has been launched with a view to providing a tie between those who have left the School and gone out into the world and those who remain behind, whilst it will also afford a useful outlet for the literary activities of students past and present. The first issue is a very creditable one and will take a high place among similar publications, and we can only trust that the high standard of excellence which has been set up in this issue will be maintained in the future. The well-known South African poet who writes under the *nom-de-plume* of “Lynn Lyster” contributes a “Cedara Anthem,” and the composition has high poetic merit. This is not the only poem the magazine boasts, however, for “J. F.” contributes quite a little treatise on botany in poetic form under the title of “A Grain of Wheat,” whilst “C. B. P.” also has “A Poem (?)” of three verses on the subject of jam as an article of College diet. (The query mark, it should be noted, is not ours but the author’s—or the editor’s.) “Our School in the Making,” “Bushed,” and “Impressions of Cedara” go to make up the prose section of the magazine, so far as pure literary effort is concerned. Accounts of the doings of the Cedara cricket and football clubs, rifle association, dramatic society, and scientific and debating society are included, and they throw an interesting side-light upon the “non-official” life of the Farm. “News from the Veld” comprises a concise account of the doings of “Old Boys,” and, judging from the number of past students referred to in this section, the authorities of the School have been keeping in close touch with their old scholars. Tabulated lists of old students and present students (with their home addresses) bring the magazine to a conclusion. We congratulate the Editors upon the production of a very interesting number, and we wish them all success in their new undertaking.

Earthing Up of Wheat.

By kind permission of the Editor of the *Cape Agricultural Journal* we reproduce the following from the January issue of that journal, together with the illustrations referred to therein, as we feel sure it will prove of interest to many of our readers. (We are indebted to the Editor of the *Cape Journal* also for the blocks used in the printing of the illustrations) :—In parts of China where land is scarce and labour cheap the earthing up of wheat is practised to a considerable extent. The seed is planted in hollows, and from time to time during the growing season is earthed up. This earthing up causes new roots to grow from each knot to which the earthing up is carried, and a number of new shoots are thrown off. Thus a plant which in the ordinary way might have yielded three to five ears can in this way be forced to grow five to ten times as many. An experiment of this nature was carried out last season by Mr. T. A. Sladdin, Union Castle Buildings, Capetown. The wheat was planted in white sandy soil on June the 15th. In July the seedlings were earthed up to a sufficient height to cover the first joint above the root, and were watered for the first and only time. On the 1st August the seedlings were earthed up a second time, and on the 22nd August earthed up for the third and last time. As a check some plants were only earthed up twice, and some not at all. None of the plants received any manure, and were grown on the poor soil of the Cape Flats. The plants not earthed up yielded an average of three heads; those earthed up twice, five heads; and the three earthings up gave a yield of twenty-six heads. Not alone were the number of heads increased, but the heads from the earthed up plants were far finer. As will be seen from Plate I., ears 1 and 2 are from earthed up plants, and No. 3 from the plant not earthed up. 1 and 2 are quite double the size of No. 3. Thus the number of ears is not only doubled, but the size of the ear as well. Plate II shows the various growths. D is the original growth, C shows the roots and shoots thrown out after earthing up to the first knot. B shows a great quantity of roots and stems from the second earthing up, and A, the third earthing up, shows a weaker number of roots, but the straws which gave the roots are far more robust than those which did not.

It is intended this year to try a fairly extensive experiment on these lines, working with a view to a practical result. It has been found with the dry land experiments that the wheat sown in drills 12 to 18 inches apart and cultivated did exceedingly well, and as cultivating is necessary, there is no reason why the wheat should not be earthed up at the same time, thus burying the original roots to a much greater depth, and so enabling the wheat to withstand the drought. This point will be severely tested during the coming season.

Migration of the Great Locust Bird.

For some years past certain European scientists have been marking birds in order to study their migrations. Amongst the kinds marked is the White Stork (*Ciconia alba*). This bird leaves Europe in the autumn of the year and migrates to South Africa, where it wins respect as a locust destroyer of the highest importance, and is widely known as the Great Locust Bird. A few marked by an aluminium leg ring have been found dead or have been accidentally shot in the last couple of seasons, and these circumstances have been reported in Europe. Now, the South African Central Locust Bureau at Pretoria is in receipt of a communication from the Director of an official German institution interested in the matter, in which it is respectfully requested that the South African public be notified that the return of any rings found would be deeply appreciated by the authorities. Therefore, it is urged upon anyone coming into possession of such a ring to mail it to the European address stamped upon it, or else to forward it to the Secretary of the South African Central Locust Bureau, Pretoria, who will mail it to the proper party for him. Should the ring be retained by the finder, it is requested that at least a copy of the marks found upon it be forwarded.

Milking Machines.

In the course of the twenty-second annual report of the Agricultural Experiment Station of Nebraska, U.S.A., recently to hand, it is stated that extensive experiments in the use of the milking machine has been made at the station during the year, and as a result of these investigations the following conclusions were arrived at:—(a) Heifers in their first lactation apparently give better results by machine milking than do aged cows that have been accustomed to hand milking. (b) Some cows are not adapted to machine milking. (c) Alternative hand and machine methods of milking have been detrimental to the milk flow. (d) Manipulation of the udder is absolutely necessary in some instances before the milk can be drawn by the machine. (e) One milker may operate two machines and do satisfactory work; two milkers operating four machines can do the work of three men milking by hand; one operator with two machines can milk between ten and eleven cows per hour. (f) It was found necessary to wash thoroughly and boil the milking machine parts after each usage in order to produce milk which is as sanitary as that resulting from careful methods of hand milking. (g) The man operating a milker must thoroughly understand the care and management of dairy stock and be persistent in the attention to details in order to get good results. From these studies it would appear that the milking machine is fitted for large herds rather than small ones. We have by us a considerable amount of literature on milking machines, and we intend publishing an article on the subject in an early issue.

The "Four Oaks" Sprayer.

We have received a prospectus of the "Four Oaks" Spraying Machine from the South African agent, Mr. S. P. Morgan, 10, Club Arcade, Durban. Of particular interest is the "Four Oaks" Knapsack Sprayer, one of the many specialities of the company which Mr. Morgan represents. The tank of this sprayer is made entirely of copper, and has a capacity of about $3\frac{1}{4}$ gallons. As its name implies, the sprayer is carried on the back, and a small brass pump on the left side of the tank and fitted with a suitable handle provides the requisite force. The weight of the whole outfit is 14 lbs. Either a very fine, a medium, or a coarse spray can be used, and thick fluids, such as Bordeaux Mixture, are effectively discharged. An interesting and important feature of this machine is the agitating or mixing of the spraying fluid which it effects. With every stroke of the pump a powerful jet is forced from the bottom of the container, so that all mixtures are evenly distributed. Since the machine is suitable for spraying fruit trees and trees of all kinds, vines, coffee, and tea, as well as potatoes and other crops, its introduction into Natal should meet with a good reception. Mr. Morgan, the agent, will doubtless be pleased to send full particulars as regards prices, etc., to enquirers.

Bacon-Curing for Farmers.

The views of a successful pig-farmer who has had practical experience with bacon curing are published in an English contemporary of recent date. The writer says:—A pig at about six or seven months old should weigh about 120 lbs., and is the best baconer. I have never found big, fat pigs, weighing, say, 200 lbs., profitable, as they are too coarse for the trade; nice light, handy weights are always the best. For breed it would be hard to beat the Berkshire. In scalding a young pig, say, 100 lbs. or under, two parts boiling water and one part cold will ensure a good scald, and for a pig 120 lbs. or more three parts boiling water and one part cold.

I have cured bacon (he goes on to say) only during the winter months in the following manner:—After killing, let the pig hang overnight, and cure the next day. If the intention is to roll the bacon, saw the pig into two equal sides and remove the ribs, shoulder blade, and ham bones. If the bacon is not to be rolled, and the pig should weigh over 100 lbs., remove the ribs (which can be used fresh or salted), cut off the ham (which should be round), and cut off the shoulders straight across. If the pig is a large one, say, 150 lbs., remove the shoulder blade, as it is somewhat difficult to cure. Salting.—For pig 120 lbs., use about 8 lbs. or 10 lbs. of salt, $2\frac{1}{2}$ ozs. saltpetre, $1\frac{1}{2}$ lb. sugar, 2 ozs. ground allspice. Mix these well and thoroughly rub into the meat. I use a trough made of 2-in. deal, 18 in. wide at the bottom, 2 ft. wide at top, 3 ft. 3

in. long, and 1 ft. 10 in. deep, inside measurement; this I find excellent for long sides. Sprinkle a fair quantity of the salt mixture in the bottom of the trough, and place the sides in skin downward. Seven days after placing in trough remove sides and sprinkle a little of the salt mixture over them and replace in trough, but be careful to reverse the position by placing the side that was at first on the top now at the bottom of the trough and the bottom one at the top. Repeat this process on the fourteenth day, and at the end of the third week remove from the trough. In a pan of water wash away all surplus salt from the sides and hang up to dry for a day. I am a believer in dry salting, but always allow the brine that accumulates in the trough to remain there until the bacon is cured.

A day or two after the bacon is taken from the trough is the best time for rolling. I regard the rolling of bacon as anything but a success unless it is done thoroughly tight and solid. Only the best cord should be used. The smoking of bacon is most important. There is no necessity for the average farmer to build an elaborate smokehouse. A large drapery case about 3 ft. 6 in. square will answer the purpose very well, using the boards from the cover and bottom to make the sides, say, 5 ft. high. This can be easily done by using 2-in. by 3-in. deal battens 5 ft. long, one for each corner, and nail securely. Never place the fire for smoking underneath the bacon, but dig a trench about 6 in. deep, 9 in. wide, running from under the smokehouse to about 6 ft. back. Cover this trench and place a fire at the far end of it. On account of the variation of the wind, it has sometimes been necessary to have two such trenches, one to the north and the other to the south of the smokehouse, the fire being put in the end at which it was most effective. In smoking, damp wood chips from the wood heap answer very well. I usually leave the bacon in the smokehouse for about three days. The smokehouse should not be covered too closely, as a draught is necessary for effective smoking.

Wind Turbines.

Our attention has been drawn by the Attorney-General to the following appearing in *Chambers's Journal*, and we reproduce it here as it will doubtless prove interesting to numbers of our readers. It may be mentioned, for the benefit of those desirous of investigating the matter further, that the name and address of the firm referred to in the note are: The Steel Wings Turbine Co., Ltd., St. Stephen's House, Westminster Bridge, London, S.W. The note is as follows:—A short time ago we drew attention to the extensive use that was being made on the Continent of windmills for driving electrical machines for the supply of energy for lighting or other purposes. In this country the possibilities of this cheap source of power have not been realised, though in Germany.

Denmark, and other countries there are several firms who have built up flourishing businesses in the supply of the special inexpensive plant required for this field of activity, and numerous installations have been laid down at country residences, where the whole requirements of the house and estate, both in regard to lighting and the driving of all descriptions of implements, from the knife-machine to the chaff-cutter, are derived from the wind. This apathy may be attributable to the apparent whimsical nature of winds; but as a matter of fact official records show that in these islands the mean hourly velocity of the wind is from seven and a half to seven and three-quarter miles, and during the past year the longest period when the wind velocity ruled below five miles per hour was only seven days. Considering that a seven-mile wind is sufficient to yield some eight horse-power, it is apparent that the intervals when insufficient atmospheric movement prevails to generate energy are very short and few and far between. Of course, in order to take the fullest advantage of the wind it is essential that the wind-wheel or wind-mill should be of such design as to offer the minimum of resistance in revolution, and in this direction an English firm has effected a decisive advance upon Continental practice. The wheel is of special construction, and, unlike the ordinary type, is supported on either side of its axle, the wheel itself revolving on roller bearings, so that friction is reduced to the minimum and the power proportionately increased by the elimination of resistance losses.

The wheel is fitted with a special type of tail which automatically regulates the speed by varying the angle of inclination of the wheel to the wind. The wheel itself can be made up to a diameter of one hundred and fifty feet, whereas hitherto the diameter limit has been thirty-five feet. The whole is carried on a steel tower, the extremities of which form apices, and is stayed in position by hard steel guy-ropes. Another benefit accruing from this design is that no elaborate foundations are required, a log of wood being ample upon which to support the mill. Again, in the Continental systems a petrol or other engine must be kept in reserve to drive the dynamos during those periods of calm when the wind-turbine is inoperative, and this not only entails a capital outlay of some three hundred pounds, but invariably necessitates the services of a skilled engineer. In the new system the stand-by engine is dispensed with, and instead a battery of accumulators is used of sufficient capacity to fulfil all requirements for a week of calm, though they can be made to meet any such possibilities. It will be seen that the English system is not only cheaper to install than the usual type of wind-turbines, but costs much less to maintain, and can be operated by any one possessed of average intelligence. The advantage of the wind-turbine over the engine system of generation is that it is a silent servant the whole time a breeze

is blowing, and owing to the perfection of automatic control requires no attention when in use.

Carbolic Acid for Abortion.

The subject of abortion in cows is one that is of perennial interest, and it has once more directly claimed our attention in the form of an article in the *Farmer and Stockbreeder Year-Book* in which the writer gives briefly his experience of periodic dosing of cattle with carbolic acid as a preventive of abortion. He states that it is about twenty years ago since he began the treatment, after all that veterinary surgeons could suggest had proved a failure, with the result, he tells us, that epidemic abortion was completely stamped out in one year, and, as long as he used carbolic acid the herd kept entirely free from it

Without going into all the experimental work which he found necessary before he could proceed with safety, he gives the actual treatment which proved successful. Every in-calf heifer which was brought to the steading was started at once with one medical teaspoonful of pure B.P. carbolic acid given in linseed oil. It was afterwards found that linseed cake emulsion served equally well. Skim milk, the writer says, would also have met the case. After a week she had the second dose, giving one and a half teaspoonfuls. Each week the dose was increased until she reached the maximum in eight weeks of four teaspoonfuls (half an ounce) of acid given in a quart of linseed cake emulsion. ("I found this perfectly safe with a Shorthorn well-grown heifer," he remarks. "For a Jersey or a two-year-old Shorthorn I should consider three teaspoonfuls the maximum dose. More than this will in some cows cause shivering and symptoms of poisoning.") This dose was continued once a week afterwards, with the exception of a fortnight before and after calving, so long as the animal remained on the farm. This rid the farm of the curse it had been labouring under for some years. But it did more. Parturition became much easier, dry calving cases being unknown; the calves were stronger and healthier, and went on better than ever before; the milk was not affected, but was used at different times for cheese, butter, and the London milk trade without complaint, and the general health of the herd was improved, their eyes and skins simply shining with health, and they became almost disease-proof.

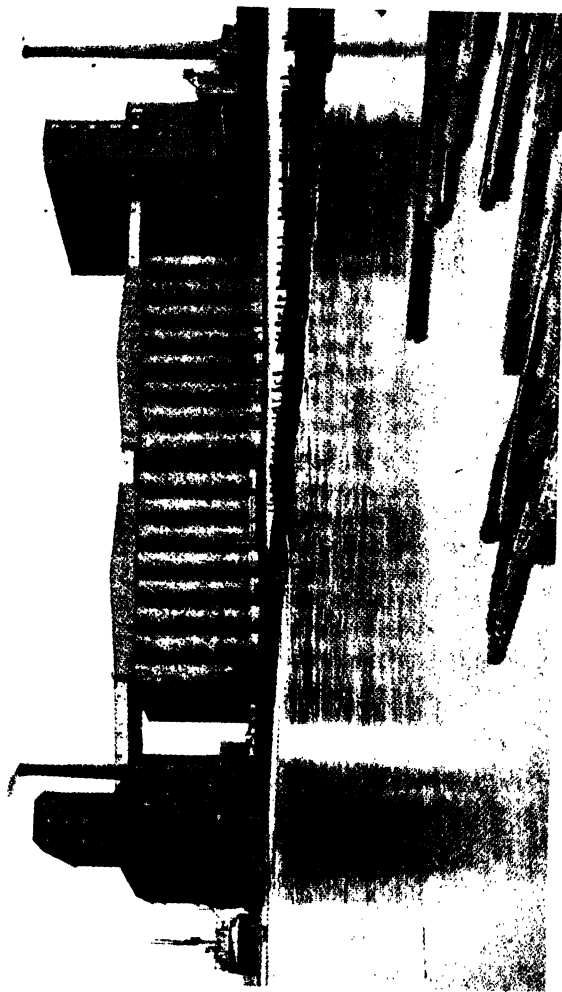
His notes on some of the results attained by the use of this process are interesting. "My 'disease book,' where the records of casualties were kept," he says, "had clearer sheets from that day. For the last nine years I have only milked two cows for the house. Now I have a small dairv again for rearing calves. Last year my two cows aborted. One I sold fat. The other was put on to the carbolic treatment, and so far she has

held and is due in February. A third cow I bought at spring has aborted, so that I may fairly consider that I have contagious abortion again. Being assured that small daily doses would saturate the system better than large weekly ones, I started giving the carbolic in bran. The cows were rather slow in taking to it, but now eat it readily enough. The shed has had six beasts in for some months—the cow which aborted and is due in February, the other which aborted is milk barren, one in milk and due in May, one heifer, now dry, which had a bad calving time at spring and nearly died, and two very fine heifers due February and March. These now have 15 lbs. of bran each evening, in which is mixed five teaspoonfuls of carbolic acid and enough water to make the bran wet. This works out at about three-quarters of an ounce to each weekly, and costs less than a half-penny each. The heifer which had the bad time was so weak that she reeled as she walked for many weeks. She is now mellow to the touch and gaining flesh rapidly. The rest of the in-calf heifers are on the other side of the farm. I am running the two in the shed purely as an experiment, and have perfect faith, or I should not have risked them.”

Farming at Dronk Vlei.

We have received from a correspondent in the Dronk Vlei district (Creighton) the following interesting letter on the progress which farmers are making in his district:—"The farmers in this locality have found out that by fertilising and constant hoeing of their crops they get a better return for their labours; before fertilisers were being used in this district the average per acre of mealies ran from 3 to 8 muids to the acre. To-day the average is running from 8 to 16 muids to the acre. All the planters I have seen tell me that it is useless planting without fertilisers, and that in future they intend to go in very largely for fertilising. The chief fertilisers used here are bone compound and bone dust.

"Beans.—This crop is coming more into favour here now, and I think in the near future the output of beans in this district will be enormous. This crop comes in after the mealies are finished with and there is now very little risk in losing it from beetles, which caused great havoc before the proper season was found for planting. *Grass.*—This crop is also coming into favour, Paspalum and Phalaris are both doing well. One farmer went in for rye grass and speaks very highly of it. Crops for winter feed, such as oats, barley, turnips, are being put in more extensively now for the purpose of feeding dairy cows, thanks to the creameries, which are bringing this commodity to a good use; in fact the farmers here are making quite a nice little income from same and find by feeding their stock they get a better return."

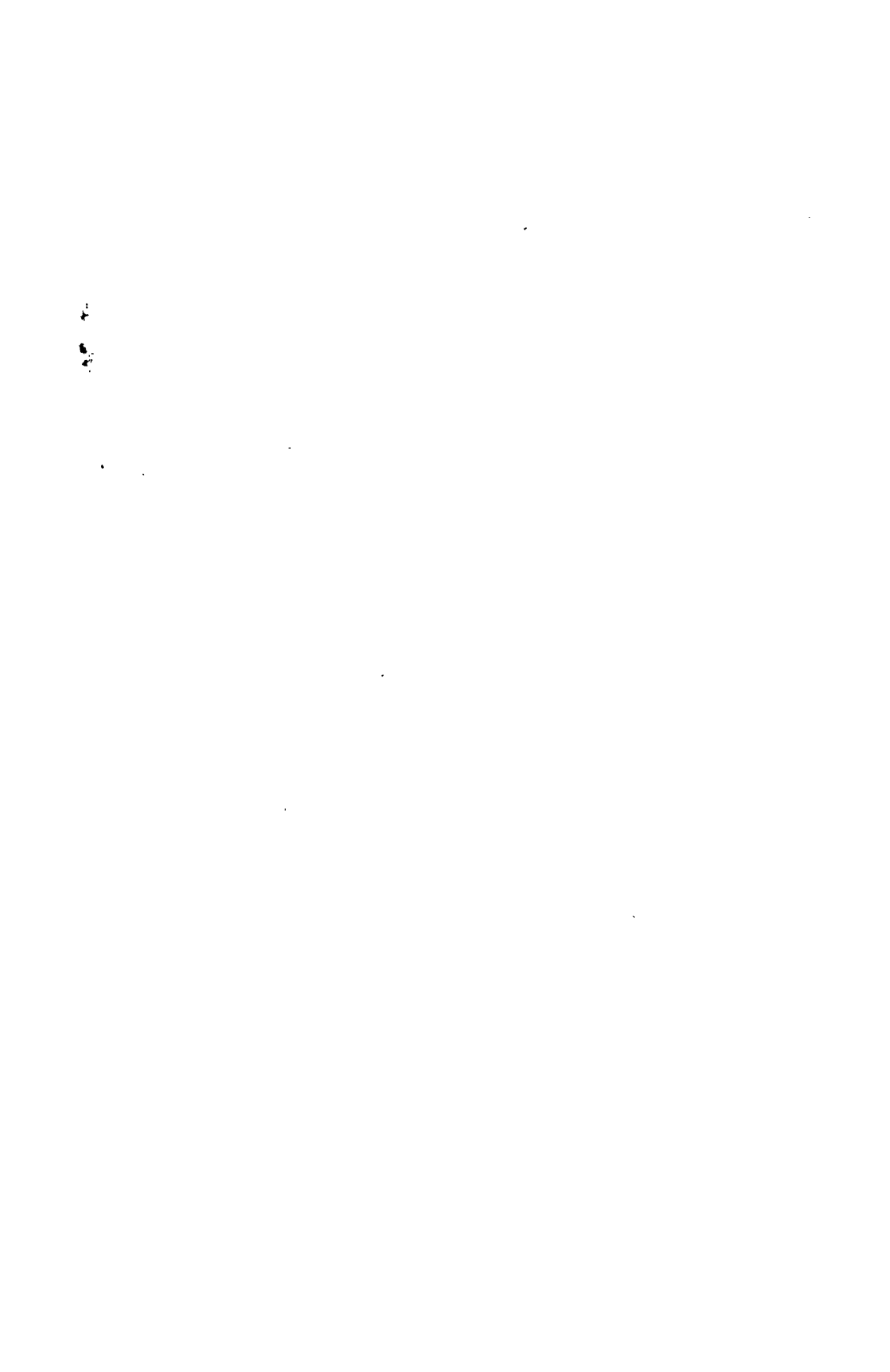


THE LARGEST GRAIN ELEVATOR IN THE WORLD.

This, the largest grain-elevator in the world, is to be seen at Port Arthur, Canada, and has a capacity of 7,000,000 bushels.

(See article by Mr. J. F. E. Barnes.)

From "Canada as It is."



Notes re Grain-Handling Appliances.

By J. F. E. BARNES, C.M.G., Chief Engineer, Public Works Department.

As the subject of handling grain in bulk is one which should be of interest to a large number of the readers of the *Agricultural Journal*, I have written the following notes, mainly culled from a paper by Mr. Magnus Mowat read at the meeting of the Institute of Civil Engineers in March last and entitled, "*Some Recent Grain Handling and Storing Appliances at the Millwall Docks.*"

As Mr. Mowat is the engineer to the Millwall Docks Company, the facts adduced may be taken as authoritative.

The paper opens with the remark that, in the interests of trade and shipping, there is an ever-increasing demand for facilities which will enable ships to be rapidly released from docks.

This can only be achieved by the use of mechanical appliances, which enable the goods to be handled with despatch and efficiency in all weathers.

The Millwall Docks Company have not been unmindful of the advantages to be gained by the use of such machines, and in 1893, Mr. Duckham, M.Inst. C.E., their engineer at the time, designed the first pneumatic grain elevator, locally known as Mark Lane No. 1, an apparatus still in use.

Since then additions costing about £170,000 have been made in labour-saving appliances in the grain department. It is these additions which form the subject of the paper under consideration. We gather that at the Millwall dock the methods which commend themselves to the American trade are not quite applicable for London. That London traders prefer "open floors," rather than silos, for dealing with the Black Sea and Russian grain, it being a softer cereal than that grown in America, and further that the cargoes of grain entering Millwall Docks are almost entirely in "small parcels," which have to be kept separate.

"The appliances which have been installed have reduced the time taken to discharge a ship to one-half that occupied by the methods previously in use."

The installation situated at the north-west of the inner dock consist of elevators and silos, together with a granary having 7½ acres of open floor storage. The equipment provides for the discharge and weighing of 550 tons of grain per hour ex ship and for its delivery into granary, silo or barge.

The elevators, which come in contact with the ship's hold, are the pneumatic or suction type. The paper contains many pages of construc-

tional details; these, however, I pass over as being of interest only to the Civil Engineer.

The discussion, which followed the paper, brought out amongst other items of interest, valuable opinion for and against "Pneumatic Suction" *versus* "The Bucket Elevator" method of dealing with grain in bulk.

On the one hand it was shown that the suction system called for a much higher working power than that required for the elevator system.

The proportion being 3.8 H.P. per ton of grain per the pneumatic, as compared with 1.5 to 2 H.P. for the elevator.

The working cost of the latter being therefore less.

But, on the other hand, it was also shown that there were many important features in favour of pneumatic elevators, *viz*:—

Having larger capacity, they are quicker in unloading cargoes, thus saving demurrage rates. They do not spill the grain. Above all they dispense with the expensive process of "trimming." They have an adaptibility for all weathers, and for use with small or mixed parcels of grain which the legs of a bucket elevator do not possess.

With the pneumatic system the position of the grain in a ship's hold, whether under the hatchcomb, or wherever it might be, the pipes are readily led to the grain. In this regard it was shown that pneumatic machinery offered many advantages upon any other type, when it came to dealing with the more difficult parts of the cargoes. Especially so in the case of steamships, in which the grain was frequently carried in empty coal bunkers, and was nearly always stowed on either side of the propeller-shaft tunnel, which passed through the holds at the after end of the boat. "It was obvious that grain in such position could not be reached by an ordinary elevating leg with its endless-band, and buckets, while, as was well known to all who had had experience of the operations of a pneumatic plant, the suction nozzle and 'Armadillo' pipe did deal with grain in these difficult positions with comparative ease and economy."

With regard to rapid discharges, instances are cited where cargoes of upwards of 3,800 tons had been cleared in 10½ working hours.

In proof, however, that there were cases where a combination of bucket elevators and pneumatic plant was advantageous, the engineer to the London and India Docks quoted an instance where a steamship, the "Wellington," with 53,000 quarters of wheat, oats and barley on board, divided into forty-three parcels, from the Black Sea, was, by the employment of three floating suction elevators and six bucket elevators, discharged in three days.

Further, he calculated that had suction plant alone been used, the power, instead of being 1,400 H.P., would have been 3,500 H.P.

With reference to the *handling of grain in bulk instead of in bags*,

the commercial difficulties which had to be overcome, and many of which "had not been overcome even now" were touched upon.

In Canada, where the grain was sent to the ports in very large quantities, it was *graded* before it left the farmers' hands, or before the farmers knew to which grade it belonged, and it was turned into grain elevators in quantity, irrespective of ownership, "so that the grain elevators were filled from top to bottom. That was not the case in England: when a ship arrived at a port, its cargo of grain was sold to various purchasers and was split up into smaller quantities, *each purchaser insisting upon having his own lot kept separately*. Perhaps one parcel would fill a silo and a half and another two and a half, and so on. So that a very large portion of the granary was unoccupied for the time being."

In America, grain was classified or graded according to locality and quality, and "the granary might be likened to a bank; grain was deposited at one place, and the next day an equal quantity of the same grade could be drawn at another." This could not be done in London. Again, Londoners object to the grain being *weighed in bulk* by the automatic weighing machine, and the old hand method had to be resorted to.

In some quarters preference is, it seems, given to the *open floor* storage system as against storage in *silos*. This, authorities hold to be a great mistake, even where small parcels had to be dealt with "it was possible to have twenty silos with twenty different kinds of grain in them, and to handle the grain just as well as in the level-floor system." In proof, attention was called to the fact that The Mersey Dock and Harbour Board are altering their system to silos in order to discharge from such vessels as the "Celtic," 3,000 tons within 30 hours.

In Argentina, where grain had for some considerable time been handled in bulk, what are termed "transit silos" are adopted, and are so called because they are intended not for storage, but for handling grain in transit from the railway to the steamers, but as ships are not always alongside, the transit silos provided the requisite temporary storage, and liberated the railway trucks without delay.

There are in Bahia two such silos, each holding 10,000 tons of grain in bulk, as also accommodation for 5,000 tons of sacked grain. The loaded train is run over hoppers, into which its contents are shot through slides from each truck.

Ten wagons can thus be emptied simultaneously at each silo. To empty each wagon of 40 tons occupies only five minutes.

From the hoppers, the grain is lifted up to the towers by bucket elevators and delivered through weighers, 20 tons per tip, on to the distributing band, and thence to storage bins, or direct into the ships, as the case might be.

For *sacked* grain the same delivering bands are used, but at a lower

speed, and are fed by sack elevators from different floors. Flying sack-shoots convey the bags to the ship and about 3,000 sacks per hour can be delivered.

As to "sack" *versus* "bulk," it was pointed out that although, generally speaking, sacks might be rapidly handled and placed on a ship, there was always the question of storing them in the holds. That had had to be very carefully done in order to ensure the safety of the vessel, time and labour were wasted and much delay ensued; and until those countries from which grain is still sent in sacks, were brought into line with the vast grain-producing countries of the west, where "bulk-handling" obtained, economical and rapid loading of steamers would be impossible.

Moreover, the question having been gone into with a representative of the corn trades, it was shown clearly "that if sacks could be abolished in bringing grain from abroad, its cost in England could be cheapened by nearly 10s. per ton."

Another item which was discussed brings to light the astonishing fact that, in order to meet the peculiar requirements of the London market; although the dirt was by ingenious machinery removed from the wheat, it was again incorporated with the grain, the explanation advanced being, that such was necessary to retain the original weight of the grain.

Re Dust in Wheat.—One speaker put the matter thus: "Efforts were made to separate the dust from the grain, but when this had been accomplished the first request made was to put it back again. Merchants paid for the dust, and they liked it to be left in the wheat, although the wheat was much more valuable when the dust was extracted; instead of wheat in one sack and dust in another they preferred them mixed."

The scale upon which the corn industry is conducted in Canada may be judged from the fact that the grain elevator at Port Arthur has the enormous quantity of seven million bushels.* See photograph.

To anyone who takes sufficient interest in the subject to follow it up, I strongly recommend a perusal of John Foster Fraser's admirable work entitled "Canada As It Is," Chapter 8, dealing with Storing and Distributing Corn, gives a lucid and graphic description of the corn trade and granaries in Canada—a perusal of that chapter, as also the rest of the book, will well repay the reader. For example, having given a pithy but lurid description of methods adopted in "cornering" of wheat, he goes on to explain, "The farmer in Manitoba, Saskatchewan, and Alberta is beyond the pale of all this; he knows he will receive from somebody a certain price for a certain number of bushels he has undertaken to supply. The thing he is not sure of is, how his wheat will be graded? That is done at Winnipeg. The Government Inspector, who does not know

* 896,000 bushels = 20,000 tons (long); 44·8 bushels = 1 ton.

from where the wheat has come, or where it is going, mounts a car; he has a long tube and he draws samples from 15 places in the carload, mixes them, examines them, declares their grade, and issues a report. That is sent to the farmer. If he had reckoned he was sending out 'No. 1 Northern,' whereas his wheat is officially graded 'No. 4 Northern,' he can demand a survey. This is, a further examination and test by officials of the Winnipeg Board of Trade, who know neither the names of the seller, nor the buyer. Their decision is final, . . . from leaving Winnipeg the identity of the wheat is lost, . . . the wheat gambler in the East holds contracts to be supplied with half a million bushels from Alberta. But it is nothing to him if his No. 1 comes from the territory of Assinboya, so long as it is No. 1 Northern."

"When the elevators at Fort William or Port Arthur are reached, all the wheat of the West, of the same grade, is shot into the same bins, and the bin holds between 75,000 and 85,000 bushels. Here it will be stored for three, six, possibly nine, months, and is withdrawn just as the world hungers for bread."

In the same bracy manner he goes on to recount numerous other details connected with the handling of wheat in bulk, how electrically-worked machinery is employed to sift the wheat from the chaff and dirt, and how each is subsequently dealt with, as also how damaged wheat is treated, and how damp wheat is dried, by an elevator for the purpose, and fitted up with the requisite machinery, enabling 50,000 bushels to be dried in twenty-four hours; such wheat, however, is not allowed to mix with standard wheat. It is sold on its merits.

That duck-raising can be made a very profitable side line on the farm is no longer a doubtful question. With artificial means of hatching and rearing the young, it is inadvisable to keep a large flock of hens for hatching the duck eggs. There is a ready and good market for both duck eggs and meat.

The primary consideration in the selection of pigs for slaughter is health. Pigs suffering from any abnormal conditions or treatment creating feverishness or a rise of temperature are not fit to kill. Animals recovering from disease, or the results of accidents such as bruises, when slaughtered immediately afterwards do not provide a presentable or relishable class of flesh, and are difficult to cure.—*Live Stock Journal*.

Agricultural Motors.

By G. H. M.

It is with considerable hesitation one can muster sufficient "callousness" to sail the many hopes and expectations built around the motor tractor (oil, petrol and alcohol), for ploughing and transport purposes in this country.

The local daily papers have fully reflected the prevailing idea as to size (horse power and weight) and what is expected of these motors. A few words of warning at this juncture may not be amiss, and may possibly save not a few of our more progressive farmers from a lot of worry and useless expenditure.

It is thought by most of those who are interested in this subject that motors of 15 to 30 "brake" horse power, and, most captivating of all, weight only $3\frac{1}{2}$ to 5 tons, will be the right thing for our requirements. The latter is the most serious mistake of all. To obtain tractive efficiency there must be weight to give adhesion.

We have a fine example at our doors. Why does the Railway Management increase the size and weight of their locomotives year after year? Because the light engines have not sufficient strength to pull a paying load, nor enough weight to give the proper adhesion to the rails. It is a well known fact that weight gives adhesion, which in turn gives tractive efficiency or grip.

Another very important point is the question of horse power. Those not versed in the mysteries of mechanical horsepower may be surprised to know there are three ways of rating an engine, *viz.*: Indicated, brake and nominal. The first is the power the engine is capable of developing plus power absorbed by friction of the moving parts.

Brake H.P. is the maximum power the engine is capable of transmitting to another machine.

Nominal H.P. is more of a commercial term, its origin being somewhat obscured. It is only applied to steam engines and represents about one-third of the brake horse power; thus a 15 brake engine would be a 5 nominal H.P.

The words "horse power," as understood by many persons, represents the power that can be developed by a good, strong, averaged-sized horse.

But when applied to motor engines, this idea is very misleading. Nothing demonstrated this fact more thoroughly than at the beginning of the automobile era, when the first manufacturers reasoned that if one or two horses draw a carriage all day a one or two horse power motor

engine ought to be sufficient to do the work. But they soon learned that they must cut loose from this sort of reckoning. Practical experience plainly shows us that to cope with the varying conditions of field work it requires 7 to 9 brake or $2\frac{1}{2}$ to 3 nominal horse power to pull a single-furrow plough cutting a furrow 14 inches wide by 4 to 6 inches deep, and 10 to 12 brake horse power to cut 7 to 10 inches deep, in virgin land of mineral origin; in old ploughed fields 4 to 6 brake horse power is necessary.

Most of the land in Natal is mineral, whereas it is said the land in other countries is more of a vegetable composition.

The above figures are taken from data carefully compiled day after day for months past of actual results and work done in this country under local conditions. The figures are amply verified by result of the international steam and motor ploughing competition, held under the auspices of the Winnipeg Industrial Exhibition Association, on the 17th of July last, at Winnipeg, Canada. The winning motor was 40 brake horse power, pulling a 4-furrow plough, the driving wheels of the motor being 24 inches wide equipped with good lugs or cleats on the tires.

It is not the object of the writer to enter into the merits or demerits of the oil, petrol or alcohol motors, but it is up against our motor enthusiasts to be careful. There are no internal combustion ploughing or transport engines at work here yet, but there are steam outfits of the direct haulage type working successfully and economically under local conditions, and may be seen at any time.

The internal combustion motor is a delicate machine; the working and wearing parts need skilled attention and care. The power is not flexible like steam, consequently there is no margin for emergencies; for stationary use it is the ideal power, but for field work steam has not yet been beaten.

Every man has his own interests at heart, therefore do not be led away by being told that the ordinary three or four-furrow horse or ox plough is the right thing to hitch behind an engine. If the manufacturer of the engine cannot produce a plough built for, but is only concerned in selling, his engine, leave him alone and look elsewhere for some other maker.

When the engine and plough is purchased house it when not in use, and take the same care of it as you do your favourite horse.

Don't expect to plough the moon with it. Some of our farmers have pointed to land where animals could not find a footing, and asked if the engine could plough such places. Don't look for miracles; use common sense and success awaits you. There is more work and trouble attached to engine ploughing than the old-style ox plough, for the very good reason it cannot be left to the natives. There are times, owing to unfavourable weather, when a lot of time is lost, but when the ploughing

does commence a great deal is done in a very short space of time. He would be a poor farmer who could not do in one year what it now takes three to four years to accomplish.

The following few hints may be of some use to those contemplating buying an outfit:—

For each ploughshare 14 inches wide (cutting 14 inches wide) there should be not less than 8 brake horse power. In other words, an engine or motor of 32 brake horse power for a four-furrow plough, this for ploughing 4 to 6 inches deep, and 12 brake H.P. or 48 B.H.P. engine or motor for four-furrow plough, cutting 7 to 10 inches deep.

The tires of the smallest engine should under no circumstances be less than 24 inches wide, and be equipped with diagonal grips or lugs standing up at least 2 inches from face of tire, and spaced about 9 inches apart; flat strips of iron with little or no projection are useless.

Avoid the motor tractor with the high speed marine or motor-car type of engine, they lack the dead weight so essential to a good tractor. With the above types of engine the driving wheels have a marked tendency to spin round on their axles without moving the tractor an inch. This is entirely due to lack of weight and consequent defective adhesion to, or grip of the ground.

Dead weight, high power and wide driving wheels must be the watchwords.

A gang plough of the rigid type is not a success; the beams should be in pairs, each pair being hinged to the drawbar or platform which forms part of the plough. With this type good, uniform work can be accomplished. They should be equipped with circular coulters of liberal diameter. An engine plough is a very different implement to the ordinary animal plough. The latter would go to pieces the first season, not being strong enough to stand the excessive strain exerted by the engine.

An engine built especially for road or transport work will never be a success in the field for ploughing, but the ploughing engine is a splendid machine for all-round work.

The most successful engines for transport are 100 to 130 brake, or 32 to 40 nominal H.P.; driving-wheel tires are 4 feet wide; they pull a big load and have ample power to get out of a bad place and climb a steep hill.

While individuals can be beguiled into purchasing engines built for use in countries where fine macadam roads are well looked after, so will our transport problems remain unsolved.

Exercise is about half the winter ration for laying hens.

The Dried Fruits Industry.

By R. J. BULMER, Stellenbosch.

(A Paper read before the Paarl Farmers' Association.)

At a meeting of the Paarl Farmers' Association, held on August 31st, Mr. Ralph J. Bulmer read a paper on fruit drying. Mr. Isaac Perold presided, and amongst those present were a number of students from Elsenberg College.

Mr Bulmer said: In reading a paper on fruit drying I wish to make it as simple as possible, as I am doing it for the benefit of those who have had little or no experience of the work. I shall endeavour to touch on the work from the growing of the fruit until it is packed in boxes ready for the consumer. I shall confine my remarks to apricots, peaches, pears, prunes, and raisins.

VARIETIES.

I consider the best variety of apricots is the Royal. It is a good colour; it ripens evenly, and is a fairly consistent bearer. There are other named varieties that make as good, or even better, a quality of dried fruit; but they have not the name of being regular croppers. The Cape apricot also makes an excellent dried fruit, but on account of its colour it never has the same commercial value as the Royal and other darker-fleshed varieties.

Peaches.—All varieties of the so-called American yellow-fleshed peaches make excellent dried fruit. There is no doubt, however, that the best of all is the Muir. It is a good bearer, and regular; it has a higher percentage of sugar, and is the best colour. I am aware that there is a large quantity of Cape peaches dried and put on the market, and I have no doubt that these are what we see quoted in different market reports at such low figures, often as low as 1½d. per lb. In my opinion, this variety can never be dried commercially.

Pears.—Pears can be classed with apples in so far that all varieties can be made into dried fruit, but there are very few varieties that will make a gilt-edged article. There is no variety that can compare favourably with the Bon Chretien.

Prunes.—So far as I am aware, there is only one variety of commercial prune successfully grown in South Africa, and that is the California d'Agen.

Raisins.—Grapes of the Muscat varieties will all make a useful dried article. The Hanepoot is the best of all.

GROWING.

To get the best results the growing of the fruit for drying should be just as thoroughly done with regard to fertilising, etc., as if it were grown for the fresh fruit market. When heavy crops of fruit set it is absolutely necessary to thin out. The cost of handling the large fruit is less than if it were all small. Comparing pound for pound, and the difference in prices is so great that there is no comparing the two, and, most important of all, it is absolutely impossible to get regular crops without thinning, and the trees will live and bear years longer. The above applies to apricots, peaches, and plums. With regard to prunes, the best mode of thinning them is to thin out the branches of the trees in the winter, taking care to keep all water shoots off the trees during the growing season.

PICKING.

Although looked on by most growers as not very important, there is no doubt that the success of fruit drying is dependent more on the stage when the fruit is picked than at any other time of the work. Apricots and peaches should be thoroughly ripe, but not over ripe; if they are picked too green they will make a tough and unattractive article. On the other side, if too ripe half the fruit will go to waste, and when taken off the trays there will be little more than skin left. Growers often make the mistake that, instead of picking their fruit every day, when it is at the right stage of ripeness, as they would for the fresh fruit market, they let a lot get over-ripe, and it consequently falls off the trees. This is a great mistake, as fruit bruised by falling never makes such a good dried article as picked sound fruit; in fact, all bruised and otherwise damaged fruit should be dried separately. Pears are best picked at the same stage as when picked for the fresh fruit market, and then allowed to get thoroughly ripe in the picking boxes or baskets, and the ripe ones sorted out periodically. An unripe pear will never make a saleable dried fruit.

Prunes must be thoroughly ripe before harvesting. They are an exception to the general rule, in so far as they can never get too ripe, and there is great danger of getting them too green. The safest plan with them is to let them fall naturally off the trees and gather them up every day. Great care should be taken not to let them get sun-burned; also great care should be taken to keep all broken fruit apart from the other. This fact I will touch on later under dipping.

Grapes for raisins should be picked on the same principle as they are picked for wine, that is, with a saccharometer, and grapes that show less than 25 per cent. of sugar will make a very poor raisin.

CUTTING, ETC.

I will presume that you have all the necessary appliances, such as trays, sulphur-houses, dipping kettles, etc. All fruit for drying should be

properly graded, thus saving a good deal of expense, and assuring an even quality afterwards.

Apricots and peaches should be cut cleanly round, and not just pulled open, as done by some people, for a ragged-edged dried fruit never has the same commercial value as a nice clean-cut sample. After the fruit is cut, and this should be done directly on to the trays, and each half put in its place immediately and not cut in a great heap and put out afterwards, care should be taken to place as much fruit on the trays as possible and so economise a space. The surface of the fruit should never be allowed to dry off before putting it in the sulphur-house. Should this happen, it is advisable to sprinkle it with water.

Pears.—Pears should be peeled and quartered, and the cores taken out. Great care must be taken that these do not dry out before sulphuring. A plan practised by many is for each cutter to have a basin of brine by him, and to dip the fruit in this after cutting. If possible, it is advisable to have all your pears sulphured, in time to allow them to get a few hours sunshine on the first day. Should this not be done, there is a great likelihood of these being a large percentage of very dark-coloured fruit.

Apricots, peaches, and pears are all treated the same way after they are cut and on the trays. The quantity of sulphur to be used depends a good deal on the condition and variety of fruit being sulphured. Unfortunately all dried fruit sells on its appearance; therefore, rather use too much than too little sulphur. Speaking generally, one pound of sulphur will be enough for 200 lbs. of fruit. Should there be less fruit than will fill the sulphur house, then proportionately more sulphur will be required. Providing the sulphur is burning well, two hours will be ample time for the fruit to get thoroughly bleached. The best guide to the beginner is to see that all the cups of the fruit are full of liquid. After taking the fruit out of the sulphur house, it should be immediately placed in the sun. Should it be too late in the day for this, it is advisable to leave the fruit in the sulphur house all night.

Prunes and Grapes.—These both require dipping in a solution of caustic potash to crack the skins to allow the moisture more rapidly to evaporate. The potash should be pure, and should be used at the rate of 1 to 20 gallons of water. This must always be kept at boiling-point. Before using it is advisable to test the solution with a small quantity of fruit—that is, plunge it in and examine it, when it should show a quantity of very small cracks; these should be so small as to be hardly visible. The length of time required for dipping should be just a plunge in and out—that is, about five seconds in the liquid. A barrel of clean, cold water should be handy, a running stream where possible, and the fruit should be immediately rinsed off in this after dipping in the potash. This will go a long way in preventing the so-called sugaring of raisins. For

layer raises the fruit, of course, must not be dipped. I am absolutely convinced that we, in the Paarl district, cannot produce layers; it would take too long for the fruit to dry, and the expense of trays would be too great. The fruit, immediately after rinsing, should be spread on trays. If there is a likelihood of these being dewy nights, it is advisable to stack the trays every evening. After the fruit has been exposed to the sun for two or three days, it should be examined. If it is then dry enough to be handled without squashing, it should be scraped up into heaps at either end of the trays, and allowed to dry out by the air. This allows for a much more even dry, and also prevents the smaller fruit from getting dried up and spoiled. In the case of prunes, all "frog bellies," i.e., prunes that evidently did not get cut by the potash, and are bloated, should be kept apart from the others, and by no means be scraped into the heaps.

The next process with the fruit is the sweating. As soon as the fruit is thoroughly dry—and after a little experience a drier will soon be able to tell when this stage has arrived—it should be tested by taking a small quantity and giving it a hard squeeze; should it break open and show moisture, it is still too fresh. The time of the day it is tested will make a difference. Whereas fruit tested in the afternoon will appear quite soft on account of the heat of the sun still being in it, the same fruit will feel comparatively hard in the morning. If there is quantity enough, the best place to sweat fruit is in a cool room on an open floor. The fruit should be thrown into heaps about two or three feet deep, and allowed to sweat for three or four days, after which it should be left for a fortnight, and then be turned again. Providing the fruit was brought in in the right stage of dryness, it should need no further handling until wanted for packing.

PACKING.

I do not advise beginners to process and pack their own dried fruits. This is an expert's work, and if not properly done it is likely to spoil a lot of fruit. It is not absolutely necessary to process or treat apricots and peaches before packing. These should be packed in strong boxes to hold 25 lbs. This is found to be the most suitable size of package for our markets. The actual picking is very simple, as follows: Make up the boxes with the lid on instead of the bottom, place your paper in the box, and then plan a layer of fruit in the box with the cut side downwards, afterwards fill up the box and press fruit in firmly until the requisite quantity is in.

Prunes have to be processed before packing. This is done by either steaming them or dipping them in boiling water, which will cause them to swell and have a good gloss. There is great danger of destroying the flavour of prunes by over-processing them. In my opinion most prunes in this country are over-processed. However, as long as they sell on their looks and not flavour this is bound to happen.

Now that I have roughly outlined the work in connection with fruit-drying, I should like to offer advice to those about to start this work. Firstly, make your motto, "The best is good enough for me," and work up to it. Drying fruit is like wine-making in so far that anyone can do either provided he has the right material, but only by giving their closest personal attention to the work and being thorough. Secondly, I consider that to be successful co-operation amongst producers is absolutely essential. A grower cannot afford to dry a small quantity of fruit; but a number of small growers together by combining are able to turn out a large quantity of equal grade. The cost of necessary appliances is heavy. There, again, co-operation will help. There are certain things one must absolutely have. Some growers dry their fruit on Spanish reed trays. These I do not recommend. I call them cheap and nasty. A wooden tray is indispensable. These, of the regulation size, 8 ft. by 3 ft., cost anything from 2s. 6d. each and upwards, and they will hold 60 lbs. of fruit, from which figure you can reckon on the cost of trays alone. Sulphur houses are best if built permanently either of brick or wood. These, for the trays of the size mentioned above, should have an inside measurement of 9 ft. by 3 ft. 6 in., and a height of from 5 ft. to 6 ft., making the capacity for about 20 to 25 trays, and allowing for a trolley line through. Temporary houses can be made by nailing calico over a light frame of the same dimensions, and pasting paper over the calico. These movable boxes I would not strongly recommend, as they are so easily damaged by our winds. For prunes and raisins a copper kettle is necessary. One of a capacity of 30 gallons is the most useful size. It should be properly bricked in, otherwise the expense of fuel to keep it boiling is too great. Dipping baskets are also required.

In conclusion, I should like to show you that there is still a large opening for the dried fruit producer by quoting you some figures kindly supplied to me by the Under Secretary for Agriculture. During the past three years there has been dried fruit imported into British South Africa to a value of £181,955, or a total weight of 13,910,707 lbs.; 1,627,456 lbs. raisins and currants, valued at £21,334; and 53,358 lbs. prunes, valued at £1,005, were imported during 1908; £27,905 value of almonds have been imported during the last three years. During the past five years into Cape Colony alone there has been imported dried fruit to the value of £157,069. These values are, as you are aware, based on a low valuation per pound. Gentlemen, I say "Buck up"; you have the soil and the climate. Capture this huge trade, and keep the imported article out.

No animal responds more generously to gentle care than a sheep.

The Living Bee.

By MARY RITCHIE,

President, Natal Bee-Keepers' Association; Natal Expert, South African Bee-Keepers' Association.

(Continued from Page 17.)

XVI.—FEASTS OF HONEY.

HAVE you ever stood by a Virginian creeper vine, in the stillness of the early morning, when the first sunbeams were among the leaves, and listened to the glad humming of the bees? It is one prolonged buzz like the sound of a coffee mill! Or have you ever watched them at a bed of thyme at noon-day how they fuss over the blossoms, picking and choosing as they do in the heather? Bees are not early risers as a rule, but when the golden-rod is in bloom in America and the weather is warm, the bees rush out of their hives at early dawn, and here in Natal, though it is past bed-time when the loquat distills its sweetest fragrance, they hurry out, singing the gladdest song of the whole year, backwards and forwards from hive to orchard, in the dusk till it is too dark to watch them any longer. The honey has a rich, nutty flavour all its own.

About the same time as the loquat the mango trees bloom (the beginning of July on the Coast), and over these they rejoice with the same glad hum. By the time the Bourbon cherry trees come out, the first excitement of the spring is over and they settle down to steady work, beautiful snowy combs are built and brood-rearing goes on apace.

Then comes the orange blossom. We thought perhaps that nothing could be lovelier than the cherry trees, but this is a beauty feast beyond description. The bees are happy, but too frequently on account of the windy and unsettled weather at this time of the year the honey crop is disappointing. What honey is stored, however, is, as one would expect, of great whiteness and purity. The same may be said of the equally fragile apple blossom and the uncertainty of spring.

In some districts the gum trees flower and the rush begins. The sections fill rapidly, in three, two, perhaps another day they will be capped over, but the beginner has to learn that sections are not capped over straight away; the honey must evaporate first. At last capping is begun. The sections are removed as soon as finished that is sealed tightly to the bottom and capped over completely, and marketed at once. This is ideal progress, but, being the spring, what often happens is this. The centre sections are almost finished, when alas, for the bees, the weather changes

and there are signs of rain. It is no bee weather that follows either wet or windy every day. If it continues the bees will uncap a cell every here and there and the fine appearance of the sections will be spoilt. To prevent this the skilled bee-keeper working for the market feeds back extracted honey—deceives his bees, in fact into thinking there is no cessation of the honey flow. The food must be pure honey diluted with water (to feed sugar syrup now would spoil the sections).

In many localities this windy spring weather is a time of scarcity. After the fruit blossom is over and before the summer comes with its flowers, there is oftentimes a lull. Drones even are killed off as if it was winter and unsealed brood pulled out and thrown away. But the spring rains that have kept the bees at home have called a thousand flowers into blossom. Each successive rain brings the summer nearer and hastens the honey-harvest of the year.

South Africa is a country of feasts and famines in honey as in everything else. Once in six years the buckweed (*Ecteinanthus origanoides*) blossoms and keeps bees and bee-keepers busy, sections are filled quick and fast capped over white as snow. When this happens botanists and bee-keepers are alike interested in watching the high tide of blossoms set in all over the bush.

This plant and the *Schotia* among flowering trees cannot fail to attract the attention of anyone interested in flowers or bees. But there are hundreds of others well deserving of attention and study. Not the smallest wild-flower, not the plainest bush-tree but has its blossoming time. "It is a tree with yellow berries but it has no flower" some one remarks in describing a plant, and we know that the flowers must be small and insignificant—green, perhaps, to escape detection, but they were there all the same and the berries a proof of it. "*Your* pineapple plants may have flowers but *ours* have none," is the remark of another superficial observer. The bees know better, and the white butterflies; they seek the blue flowers of the pineapples and the bananas to afford them pasturage.

Many of our beautiful blossoms hold honey but not for the bees. It is a case of the fox and the stork. The stork could not drink out of the shallow plate the fox put before him and the fox could not drink out of the tall jar the stork provided. In the same way the flowers spread their feasts for special guests. How many of our flowers are long-necked jars only the butterflies can drain the honey quite inaccessible to the bees.

There are plants like the Poinsettia, with its little golden cups surrounded by bright red floral leaves, and the *Asclepiadeae*, with its strange little lilac pouches, in which the honey glistens in the sunshine, but how many flowers hide it away in secret pockets and long-tubed spurs. Take the Labiates alone. In the mint and thyme the bees are happy, but in the bright red salvia—a blaze of autumn colour in up-country gardens—

the flower is so long and narrow that the bees cannot enter and the sun-birds claim the feast.

But here a strange thing happens to many flowers, for determined to have the honey and entrance by the front impossible, the bees quietly bite a hole from the outside through the tube and drink the nectar. In the heaths in England hundreds of blossoms are bitten in this way, and in our own wattle woods there is the Granny bonnet, a little orchis (*Disperis Fannineae*), of which the flowers reveal a tiny circular hole just above the nectary, showing how the honey has been taken away.

Another honey plant is *Leonotis Leonurus*. Its gay spikes of scarlet-orange gladden the traveller all the way from the Coast to the Berg. The flowers are visited by the little honey-suckers, and from this fact it is called by the natives "Tyala be inyoni," beer or honey for the birds. In the Cape it is known among the natives as *umfincafinca* from the same fact. Among the Zulus it is u-Munyani. This plant is not usually regarded as a bee flower, but this year we notice the bees constantly at the blossoms; perhaps they are unusually large. It is exceedingly interesting to watch the bees push their way in, sometimes turning a complete somersault in order to get a better foothold. They have been equally eager over the red salvia, not round the bushes for the flowers are too deep-throated, but all over the ground among the blossoms that have fallen. Each corolla has a drop of very sweet nectar which they are not above stooping to gather.

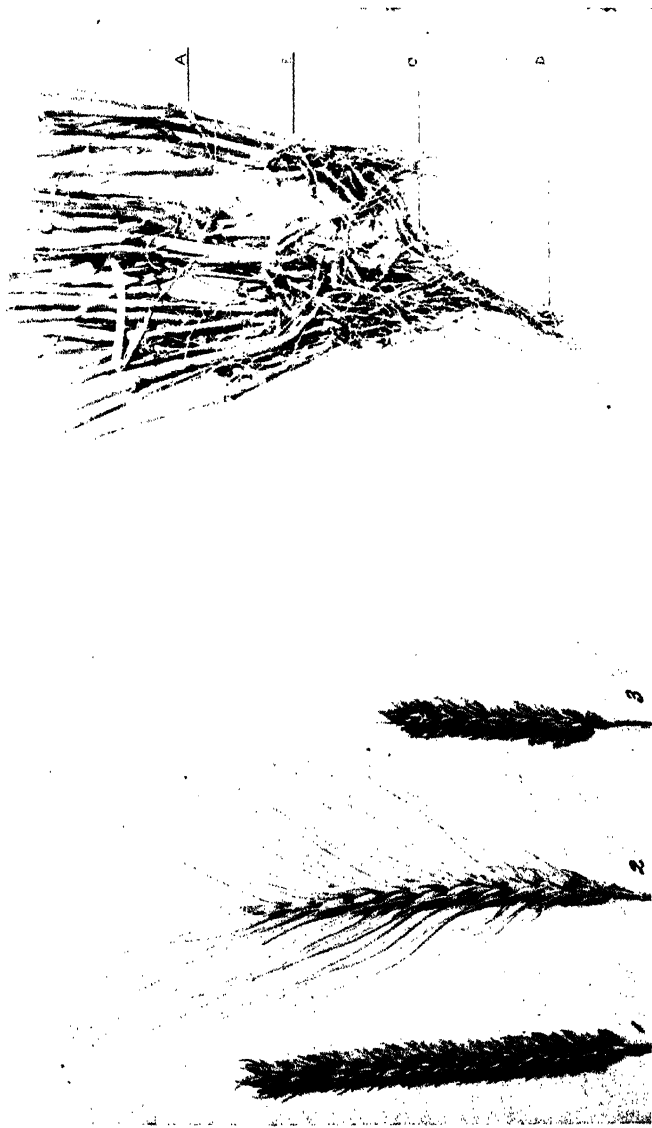
XVII.—GAY DRONES.

"I have found a purple-headed drone," writes a bee-keeper, "and I am very anxious to know if any one else has seen one."

I noticed three or four one year, but, as far as I remember, they had helmets of many colours—very gay.

In the X Y Z of bee-keeping, Mr. Root says: "This is a queer peculiarity in natural history. Almost every summer someone writes or sends some specimens of drones with heads of different colours. Not only do we occasionally find drones with white heads, but we find them with heads of a cherry-red colour, again of a bright green, and at other times yellow. I confess there is something very wonderful and mysterious to me in this matter. Why queer old Dame Nature should decide to single out the heads of drones to sport with in this way will, it seems to me, be a pretty difficult matter to explain. Why should this peculiarity show itself in the drones more than in the queen and workers?"

It seems to me more curious that Mr. Root, so keenly appreciative of the beauties of Nature and who has written so much on this subject in its most prosaic aspects, should be puzzled here. Had Dame Nature singled out the drone's head to sport with, it would indeed have been



Blocks by Courtesy of the]

["Cape Agricultural Journal,"

EARTHING UP WHEAT TO INCREASE YIELD.

These pictures illustrate the results of some interesting experiments in the earthing up of wheat with a view to increasing its yield which have been made in the Cape Colony recently. A full reference to them will be found in our "*Notes and Comments*."

strange, but has she? What of the peacock's tail, the pheasant's plumage, the robin's breast? Bee-keeper will find an answer in her own letter, for she says, "The spring has come, has come, has come."

Prof. Thomson puts it in his "Studies of Animal Life," "When the spring comes how marvellous is the re-awakening, temperature rises, colours brighten, life becomes strong and lusty, and the earth is filled with love. In human life one of the most complex musical chords is the love of mates, in the higher forms of which we distinguish three notes, physical, emotional and intellectual attraction. In birds the males are almost always more decorative than their mates, and excel in the power of song; nor do they woo by singing alone, but by love dances and fluttering displays of bright plumage. Insects are also very beautiful in form and colour, especially in the male sex, and a display of charms has often been noticed. The student of insect life watches at a well-head of marvel and romance."

But to come back to our drone bee. We know that the bees notice and remember colours. Is it wonderful that the drone who seeks to be reflected in his ladies' eyes—and her eyes remember have nearly five thousand facets each—should don, as the case may be, a helmet of cherry-red, purple, crimson or gold?

XVIII.—THE WEDDING FLIGHT.

"Picture a hot summer's day," writes Madame de Charmoy, "when the sun at its zenith alone keeps watch over the drowsy earth asleep beneath him. Over the sunlit country the calmness of summer reigns supreme. The winds, too, have gone to sleep, only the gentlest zephyr now and then on the hill slope caresses the long grass that thrills and quivers in the loving embrace. There, on the left, far away, the shimmering sea heaves gently towards the shore; on the dazzling shingle of the beach the waves roll, curling drowsily. The whole earth breathes love and repose."

It is on a day such as this that the future queen takes her wedding flight. The bees have swarmed with the old queen, leaving a princess "peeping" in her cell. She duly emerges into a world of beautiful things one of the most beautiful. She seems to step consciously into a world waiting to receive her. In the interests of peace she destroys the occupants of the other queen cells. She brooks no rival; she feels herself a queen.

Some ten days later, on one of those radiant summer days—a day of the days—she leaves the hive, and, taking careful note of its whereabouts, wings her way into the sunlight.

It is the noon-tide of the year; the sea of blossom is at its highest tide. The flowers have put on wedding garments and the bells the bees

are ringing are wedding bells. The honey feasts are spread. Myriads of stamens shed their pollen; the stigmas of a thousand flowers open to receive it. Love-scents are everywhere. Over this sea of blossom flies the future queen. In the air the drones are holding high carnival, making more noise than twenty swarms. Who makes the choice? The queen, the drone, or is it fate alone? Does she choose purple or green, or is the race to the strong? Soon she is out of sight afar in a world beyond our ken.

One wonders whether it is all as ideal as Maeterlinck dreams, or whether the story that queen-breeders tell of queens sometimes returning hurt and maimed from the rough treatment they receive is equally true. If so the real is by no means ideal. It must be remembered, however, that in queen-rearing yards the conditions are abnormal and human interference must be taken into account. Who can say but that in natural conditions the real is the ideal, and that mating accomplished she returns to the hive and "lives happily ever afterwards"?

In time to come she may in turn lead out a swarm or be shook-swarmed into her own hive by some up-to-date bee-keeper, but with this exception she lives secluded in the safety and security of the hive. Compared to the worker bee, her life-time seems endless; instead of six weeks, perhaps five or six years. The life of queen and worker afford a strange contrast; the division of labour is complete. For the one a short life and a merry, for the other a long imprisonment. For the one the narrow house of motherhood, for the other the sunshine and the flowers.

For many insects reproduction means death. In the case of the bees, the queen lives on, but the drone she mates with dies. His fate seems to me the most enviable in the economy of the hive. Death does not overtake him. He meets it full in the face, and that at the supreme moment of his existence, when the climax of his evolution has been reached. There is no anti-climax, no aftermath. He fights for love—and dies. Dies individually, but in truth it is the other drones that die; he lives on in the lives of innumerable workers for years and years to come.

Hens that are kept constantly scratching and digging for food are not apt to learn bad habits, the worst of which is egg-eating. Hens that have beef scrap and a plentiful supply of grit and oyster-shell or old plaster mashed up fine have little inducement to eat eggs; but if eggs are broken before them they will eat them eagerly, and in this way they will learn the bad habit of egg-eating.

The Canadian Fruit Industry.

By W. A. MACKINNON, B.A., Dominion Trade Commissioner at
Birmingham.

*(A Paper read before the Royal Colonial Institute on
December 7th, 1909.)*

[EDITORIAL NOTE.—The following paper on the Canadian fruit industry will, we believe, interest a wide circle of readers, in view of the efforts which are being made to develop an export trade in fruit in South Africa. We are unable, on account of pressure upon our space, to publish the whole of Mr. McKinnon's paper, but the portions we have omitted are such as would be the least interest for South African readers. We are indebted to the Rev. J. Scott for the copy of Mr. Mackinnon's paper.]

THE first exhibit of Nova Scotian apples made in this country was in 1860, from the orchard of the late Richard Starr, of Starr's Point, a friend and neighbour of the Hon. Charles Prescott, who introduced such invaluable varieties as the "Gravenstein," "Blenheim," "Ribston Pippin," and others, obtained through the Royal Horticultural Society. The favourite "Belle Fleur" was introduced by the late Bishop Inglis, after whom it is still commonly known as the "Bishop's Pippin." At the International Show held by that most liberal and beneficent organisation, the Royal Horticultural Society, in 1862, Nova Scotia was more extensively represented, and shortly afterwards regular consignments were first sent to London by sailing vessel, a few hundred barrels at a time; yet even under such adverse conditions, very satisfactory results were obtained, for Mr. C. R. H. Starr, who writes a most entertaining account of these early days, tells me that Blenheims then realised 35s. a barrel. By the year 1880 the London shipments totalled 24,000 barrels, while last year over 550,000 barrels were sent from Nova Scotia to Great Britain.

VALUES.

For the whole of Canada the Trade and Navigation Returns for the year ended March 31st, 1908, give the total exports of green or ripe apples (thus excluding dried and canned fruit) at 1,629,400 barrels, valued at \$1,823,645 (approximately £24,574). Of this quantity Great Britain received practically the whole, the exact figures being 1,490,311 barrels. It may be added that the dried apples exported in the same year amounted to 6,939,088 pounds weight.

Concurrently with this tremendous increase in quantities there have been quite as great changes in the methods of handling. A vast system has been evolved for preventing loss or waste in warehouse, car, or

steamer, the process beginning with careful packing of early shipments and repacking in cold storage of fruit held for mid-season or late markets; the barrels, thus packed to carry "tight," are guarded against excess of heat or cold, against breakage, pilfering, or rough usage in transit. Immense expenditure is naturally required for ventilated packing-houses, cold storage warehouses, and refrigerator cars on land, and cold chambers, refrigerating plant, sirocco fans, air shafts, and other apparatus on board ship, to say nothing of the army of men employed every year to pack and forward the products of the orchard.

FRAUDS.

Here we may refer to complaints of fraudulent packing and marking, attributed to the soulless farmer, by those who forget that the bulk of the apples pass out of his hands before they are put up for export; the business morality of the much-abused fruit-grower is no worse, and probably somewhat better, than that of his commercial friends in other parts, but in this case it is seldom put to the test. The packing is commonly done by men employed by apple buyers or speculators, many of whom represent British firms, and operate with British capital. They begin work at the orchards, from which many of the early shipments are exported direct, and are later on engaged in warehouses, grading and repacking fruit that has been put up more or less loosely for storage. They are duly instructed to observe the amenities of the higher life, or at all events to keep within the limits of error allowed by law to the judgment of the ordinary prudent man, and doubtless they begin their task with the best of resolutions, meaning well by the ultimate purchaser of their handiwork. But, just as the road to perdition is said to be neatly paved with good intentions, so the bottom of the barrel, which on sale will become the "face," is well and truly laid with fine, handsome fruit, evenly placed in narrowing circles of blushing red; hardly less attractive are the next two or three layers, also carefully placed by hand, wedging the first immovably. Then, alas! comes a falling off; whether it be that a giddiness caused by bending head and shoulders deep in the barrel induces loss of memory, or that an ardent discussion on high politics brings oblivion of common things, or merely that our packer is unable to retain the vision of that smiling "face" now hidden from view—whatever the cause, certain it is that he now becomes careless; basket after basket of uncertain quality is poured in, and only when the process of "tailing off" is reached does the memory return of that "No. 1" grade-mark, already pencilled on the "head." Then once more a couple of layers of the best are hand placed—for might not some capacious buyer demand to see the "tail"?—the barrel is pressed, nailed up, and ready for all comers. A fearful practice, you say, sign of commercial decadence and moral depravity—copied, surely, from the devious ways of the Red Man: true,

though such things have been known, at rare intervals, even on the costers' barrows and in the shop windows of this metropolis.

INSPECTORS.

But I would not have you think that such methods are approved or even winked at by growers or dealers in Canada; on the contrary, both have strongly supported the Government in its campaign, educative at first, now punitive, to stamp out these frauds. Mr. McNeill, Chief of the Fruit Division at Ottawa, has an able staff of inspectors employed in detecting and prosecuting the offences of false marking and packing. The penalties have been gradually increased, and this year the names of convicted packers have been published in a Government report. Some idea of the value and calibre of the inspectors may be gathered from the fact that when not engaged in actual inspection they are able to meet fruit-growers at orchard meetings, and in the winter at meetings of Farmers' Institutes, to discuss with them, not merely commercial problems, but those having to do with fruit culture in all its aspects; they give orchard demonstrations of spraying, of pruning and grafting, or at other times of packing apples in barrels and boxes, and always in the presence of assembled growers, than whom there are no keener critics. An inspector who did not thoroughly understand his work would have a most uncomfortable time, and would never have a second hearing.

DEVELOPMENT.

To return from this digression, please observe that apart from mere growth in bulk, startling as that growth has been, there are other features in the modern development of our export trade which are almost equally interesting. At first under Government auspices, and more recently by private enterprise, trial shipments of various tender fruits have been sent to great Britain in cold storage. Without going into details, it may be said that the experiments made with peaches, pears, grapes, and even tomatoes resulted in the collection of valuable information, which served as a guide in the selection of varieties and in determining the best methods of handling, packing and storing the fruit. Thermographs accompanied each shipment, both on the cars and in the cold storage chamber on board ship. The complete records of temperature thus obtained, together with reports on the condition of the fruit in transit, on arrival, at time of sale and afterwards, furnished information of the utmost value to subsequent shippers. In the present year we have had highly successful shipments of peaches to Glasgow, Birmingham, and London, and I have seen in Birmingham a consignment of Canadian Anjou pears, beautifully packed and in perfect condition. Having demonstrated their ability to enter this new field in a small way, our fruit-growers need only now extend their operations, since a regular supply of the right quality will ensure a steady demand.

But even in the apple trade there have been developments, such as the increased use of small packages for fancy fruit—the special egg-case-type, or the plain forty-pound box as used in British Columbia and California; still more recently a Burlington firm has been experimenting with a smaller box, holding from eighteen to twenty pounds of fruit—an ideal package for the householder, and (since it is filled with the finest apples) one likely to be twice blest at Christmas time—an equal boon “to him that gives and him that takes.” And here again we find the grower following his product to the consumer’s very door, for he actually quotes a price at which he will deliver these packages, carriage paid, at any address in Great Britain!

GOVERNMENT ASSISTANCE.

To attempt a detailed statement of the assistance rendered directly or indirectly by Federal and Provincial Governments to the fruit industry would exceed the limits of this paper and of your patience, but the main outlines may be of some interest. First, there are experimental farms under Dominion supervision in most of the provinces, and under local administration in all, where both field and research work are carried on; in addition, some of the provinces have established in various districts illustration stations which combine the functions of experimental and model farms. Here the grower has the advantage of innumerable tests of varieties of soils, method of culture, spray fluids, and many other matters which he could not afford the time, money, or space to investigate for himself. As a rule he may also look to these stations for a model which he will be safe in copying so far as conditions are similar.

At Farmers’ Institutes (in receipt of grants from the Provincial Governments, which also provide speakers for some of their meetings) at least one subject of interest to fruit-growers is sure to appear on every programme. Some of the institutes hold orchard-meetings in spring and summer, at which, as mentioned above, demonstrations of practical work are furnished by experienced men. The bulletins issued by the various branches of the Department of Agriculture, dealing from time to time with such questions as cold storage, the packing, shipping, and marketing of fruit, the export trade, insect pests and fungus diseases and their remedies, crop reports and statistics, are sent post free to all who ask for them; and it may be added that these publications are read with intelligent interest, the farmers’ early prejudice against “science” as being “unpractical” having long ago disappeared, since it is fully recognised to-day that science is but another name for sense.

Some years ago, when it was seen that the average grower either could not afford, or would not install a thoroughly efficient spraying machine, the Fruit Division at Ottawa purchased power-spraying outfits operated by petrol engines, and sprayed a number of orchards in various

districts throughout the season. This was done to demonstrate the advantages of power over hand work, and also to show the desirability of small growers uniting in the purchase and operation of the necessary plant. The fruit-growers concerned were charged with the actual cost of material and labour for the four or five necessary applications, each paying in proportion to the number of his trees. The work was very successfully carried out under the supervision of the permanent staff of fruit inspectors, and the result is that power-spraying has been adopted in the leading fruit districts, both by groups and individual growers.

The services of fruit inspectors have already been referred to, but there is still another set of men looking after the interests of the fruit-grower, even when his product has left Canadian shores. Under the Minister, the Hon. Sydney Fisher, at the time when Professor Robertson was Commissioner of Agriculture, the examination of Canadian products on arrival at British ports was perfected, and this service has been continued ever since; so that to-day Chief Inspector A. W. Grindley, with headquarters at Liverpool, has a staff engaged at London, Glasgow, Bristol, and Manchester, watching the handling of cheese, butter, eggs, fruit, and other perishable products. Not a steamer discharges her freight at one of these ports but an inspector is on hand to observe the condition of every package as it leaves the ship's side, to see that it is properly handled, and to record and report his observations in detail. The beneficial effect of this system in preventing breakage and waste will at once be evident. But the number of mistakes on the part of shippers or transportation companies which have been put right as a result of their representations can scarcely be computed.

Finally, though the fact is so well known as hardly to require repetition, the Canadian High Commissioner is always on the alert to see that the interests of every Canadian engaged in trade with this country are carefully and efficiently safeguarded. Indeed, the services rendered by the present distinguished holder of that high office, not only to the fruit industry, but to Canadian enterprise of every description, cannot be too gratefully acknowledged.

It should be noted that the object of the Government throughout is to assist fruit-growers by doing for them only those things which they could not well do for themselves, being careful at all times to encourage the spirit of self-help.

(To be continued.)

Sore spots on the necks of horses are often caused by the mane being too heavy. Thin the mane out when it works under the collar.

Cape Fruit Export.

REVIEW OF THE 1909 SEASON.

II.

THE following is a continuation of the report by the Cape Government Trade Commissioner in London on the Cape fruit export trade, the first instalment of which appeared in our last issue:—

The present freight rates charged by the Conference Lines of steamers for the cold storage in their ships are:—

For peaches 65s.

For pears and plums, 60s.

For grapes and sundry fruits, 55s.

For pines, oranges and other fruits shipped in the ventilated hold, 25s. All plus 10 per cent. primage and at per ton measurement of 40 cubic feet.

The fruit shippers have, through your Department, preferred a request that representations, with a view to certain modifications to these charges, might be made to the shipping companies. With this object, the Agent-General and I have made ourselves thoroughly acquainted with the statistics and other details of this subject in all its bearings, so as to enable us to carry on these negotiations, which have been of a prolonged nature and one not yet concluded.

I am, therefore, prevented from dealing fully with this subject at the present time.

The question of additional accommodation in the ships has also been much discussed. This is, however, a very difficult question and entirely rests with the shipping companies, but I can assure exporters that if the shipping companies are satisfied that the fruit export trade will expand, and that the rates of freights are remunerative to them, they will in their own interests increase the cold storage accommodation in the ships and probably provide additional accommodation in new ships.

The advisability of shipping fruit in the intermediate steamers has engaged my serious attention during the last three years, and I am forced to the conclusion that as matters now stand the position is far from being satisfactory.

I understand that it has been customary for shippers to pack their fruit with a view to shipment by a certain mail steamer, but that if their fruit did not find space in the mail steamer it was kept over and shipped by the following intermediate boat sailing on Tuesday, ten days after the fruit was packed. These intermediate boats usually arrive in the East

India Docks, London, on Thursday night and commence discharging cargo early on Friday morning 24 days after the date of sailing from Table Bay, and experience has shown me that, notwithstanding every effort made to get the fruit to Covent Garden before the sales closed, in most cases it had to be held over until the following Monday, as Saturday is no sale day. The consequence is that fruit consigned per the intermediate boat clashed with the fruit which arrived by the mail, which sailed from Table Bay 14 days later than the mail steamer in which it was originally intended the consignment should be shipped.

This method of shipping has proved disastrous to the export of grapes, and has been the cause of the bad condition and part failure of large quantities of grapes which were shipped under the Government Experimental Scheme during 1908, a failure for which, most unjustly, the scheme was generally blamed.

In addition to this, there is the question of cost. Fruit which arrives by the mail steamer is carried to Nine Elms Station without any additional charge, whereas if it is landed at East India Docks it is liable to wharfage and landing charges, for which a special tariff has been granted for Cape fruit as follows:—

	14 lbs.	21 lbs.	28 lbs.
Single case	1½d.	2½d.	3d.
2 Battened together	2d.	3d.	4d.
3 Battened together	3d.	4d.	4½d.

I have made an estimate of the additional charge per ton above the freight already paid on fruit landed at the East India Docks, and by adding the additional cartage chargeable have arrived at the following figures:—

Peaches and nectarines, about 12s. per ton of 40 cubic feet.

Pears, plums and apricots, about 13s. 3d. per ton of 40 cubic feet.

Grapes and apples, about 7s. 3d. per ton of 40 cubic feet.

Oranges and pineapples, about 7s. to 8s. per ton of 40 cubic feet.

The prices, of course, vary according to the size of the boxes and the number which go to a ton, and also depend on whether they are battened together or not.

I cannot say anything more about this subject at present, except that strong representations, which form part of the negotiations now pending, have been made to the shipping companies.

I would, however, suggest that if the shipping companies can be induced to make a reasonable reduction in the cold storage charges by the intermediate steamers, exporters should take advantage of the space in these ships to ship their apricots, plums, nectarines and pears, as these fruits travel well, thus creating more available space in the mail boats. I hesitate to suggest that shippers should consign their peaches by the intermediate steamers as they are not very satisfactory travellers, and I

certainly do not recommend any exporter to ship grapes by the slow boats. It is quite out of the question to expect the existing variety of grapes to keep for such a long period. If we succeed in transporting grapes in a satisfactory condition by the mail steamers it will be more than has been accomplished by any other country equally distant from England.

The transportation of grapes in the intermediate steamers has been the source of the greatest loss to the shippers in the past. It must, however, be pointed out that as the Union-Castle Co. have, at considerable cost, fitted up their intermediate steamers with cold storage accommodation, it is expected that shippers will take advantage of the space afforded, particularly as the accommodation in the mail steamers is found to be inadequate during the busy part of the season.

Fruit, which is intended to be shipped by the intermediate steamers, should be gathered and packed intentionally for this purpose; that is to say, shippers should not try to ship by the mail steamer and then, if their fruit is shut out, to keep it over for six days waiting for the intermediate boat. It would be better under those circumstances to try and find space in the following mail boat, as the fruit would then arrive on this market a week earlier than if shipped by the intermediate boat.

The best advice I can offer to those shippers who are not well acquainted with the circumstances, is to engage space in the mail or in the intermediate steamers before they gather their fruit, and only pack fruit for export if they are sure of finding space for it in the selected ships. It is absurd to repeat the mistakes of the 1908 season, when fruit was kept over for 14 days in the Docks at Capetown, and then eventually shipped by the intermediate steamers. Such shortsighted action has been the cause of much trouble and loss to exporters.

While dealing with the question of transportation of fruit, I wish to say that on frequent occasions I visited Southampton, and the East India Docks, while the fruit was being discharged, and on every occasion I found that every care was being exercised, and that both officers and servants of the Union-Castle Co. and the South Western Railway Co., as well as the docks officials, always gave their closest care and attention to the careful and expeditious handling of the Cape fruit consignments.

ENGLISH RAILWAY FREIGHTS.

With reference to the classification of freight by the railway companies in the United Kingdom, I find that in fixing their tariff, regard is given to the value and quantity of the fruit carried. For instance:—

Pears and apples are placed under Class 1 (the lowest rate).

Oranges, lemons and plums under Class 2.

Apricots, nectarines and peaches under Class 3.

Grapes, packed in corkdust or sawdust, under Class 3.

Pines (not hothouse) under Class 4.

Pines and other hothouse fruit, under Class 5.

Grapes, in any other package, under Class 5.

It will therefore be seen that Cape grapes would, according to this tariff, be subject to the rates in Class 5, which are the highest, and that Cape pines would come under Class 4.

To give some idea of the differences in the charges, I will give as a sample the rates on the London and South-Western Railway between Southampton and Ilfracombe:—

Class 1, per ton, 30s. 3d. Class 2, per ton, 37s. Class 3, per ton, 44s. 7d. Class 4, per ton, 54s. Class 5, per ton, 64s. 7d.

It will thus be seen that if Cape grapes and pines have to remain under their present class, the railway freights for long distances, such as Edinburgh and Glasgow, would be almost prohibitive. I therefore approached different railway companies and have explained to them that both Cape grapes and Cape pines should be regarded as cheaper classes of freight, as compared with those grown in hothouses, and that they are being imported from the Cape in large quantities, and I have asked that they should be placed under Class 3.

The negotiations have been of a prolonged nature and are now being carried on between myself and the Railway Classification Committee. I have not yet received a final reply, but in an interview I had with a representative of this committee I am led to believe that my request will be granted. There are at present small difficulties still in the way, which I hope will disappear before the forthcoming fruit season.

I will now deal with each particular fruit separately.—

APRICOTS.

During the past season 2,164 boxes of apricots were shipped, as against 10,486 cases the previous year. The season for apricots is very short; the first shipment arrived about the first week in January, and consignments continued to be received until the first week in February. The large shipments of the 1908 season were a great mistake, as the prices indicated. By far the greater portion was shipped as a speculation by one shipper who had no knowledge of the requirements of the London market. In a previous report, I recommended "caution and moderation" in the shipment of apricots; I also pointed out that in England apricots are not generally regarded as a first-class dessert fruit, but are chiefly used for cooking, although there is a limited demand for large and well coloured fruit for dessert purposes. I think the market will now take about 600 to 700 cases per week and will gradually expand.

During the 1909 season the fruit generally arrived in very good condition, the quality and appearance were much better, and there was a considerable improvement in the packing. I noticed, however, a few

shipments which were not carefully graded as to size; in other instances too much wood wool had been used in the packing, while a few small lots arrived in a wasty condition.

The prices made during the season were very satisfactory. They commenced with about 6s. to 8s. 6d. per box of 30 to 36, and 2s. to 2s. 6d. for 15 to 20 counts. These prices were maintained to the end of the season, and may be considered the average prices for the season; in a few instances for extra fine fruit 8s. 6d. to 10s. and even 12s. was paid for a box of 36.

The system generally adopted has been to pack the fruit in trays holding 30 to 60, and I do not think there has been any objection to it in the trade here. During the past season, however, one of the largest shippers of apricots adopted the French system, by packing 15 to 20 fruit in small boxes 11½ inches by 8½ inches, with little or no wood wool. These small boxes were shipped in crates; this was a very neat package and the prices made were satisfactory.

Apricots must be packed tightly with as little wood wool as possible; each fruit must be wrapped in a suitable piece of paper, and if trays are used they should be battened together in sets of three or four.

Particular attention should be paid to the grading of the fruit according to size, and only large, well-developed fruit with good colour should be shipped.

PEACHES.

During the past season 17,298 boxes of peaches were shipped, as compared with 12,925 boxes the previous year. The quantity was not in excess of what the market can take, although there is every reason to believe that any sudden and considerable increase in the shipments would have the effect of bringing down prices.

The first shipment arrived about the first week in January, and consignments continued to be received up to about the end of March.

The prices obtained during the season (considering the very bad condition of the fruit market generally) were very satisfactory. The first shipments during January made 12s. to 20s. per box when sound and of good size and colour, some specially good marks making up to 30s. per box of 15 to 18 and 20 to 24 counts. When the larger shipments arrived during the latter part of January and during February, the prices for the first quality came down to 8s. to 16s., 6s. to 12s., and 5s. to 9s., while the "Clingstone" yellow and colourless varieties were making 2s. 9d. to 4s. 6d. per box.

During the last few weeks of the season, in consequence of the bad condition of the fruit on arrival, the prices fell to about 5s. to 8s. for the first quality and 1s. 9d. to 3s. for the inferior grades.

The average prices for peaches of good size and colour may be taken to be 7s. 6d. to 10s. 6d. per box of 15 and 20 to 24, whereas the prices

for yellow, colourless and Clingstone varieties probably averaged 3s. to 4s. 6d. per box of similar counts as above.

During the past season the peaches arrived in rather a better condition than the previous year. During the latter part of the season, however, several shipments proved to be affected by maggots a few days after landing. This caused uneasiness amongst the buyers, as the outward appearance of the fruit was good, consequently the sound as well as the affected fruit suffered. I call the attention of the growers to this with the hope that they may find a remedy for this evil.

The grading was not always satisfactory, although there has been a general improvement. One or two new shippers showed an entire want of knowledge of the requirements of the London market by shipping absolute rubbish in the shape of small immature green peaches with long points.

Several shipments of Yellow Flesh, Colourless and Clingstone peaches were again received this season, but it is not necessary to specify them by name. It is sufficient to say that the English market does not want them, as the prices before quoted will indicate. This is unfortunate, as some of our growers, I am afraid, planted large quantities of these varieties, and, although they are not popular here, there is no doubt that the flavour of some of the yellow peaches is excellent. This makes it difficult for the growers in the Cape Colony to understand why the English market will not buy them, but let me give one of my experiences in connection with this particular subject.

One morning I walked into the stand of one of the leading commission salesmen at Covent Garden; after greeting him and inquiring how he was getting on with the Cape fruit, he said to me, pointing with his foot to a pile of boxes containing "Yellow peaches," "Look at that rubbish." Pretending not to know what he meant, I said, "What's the matter with them?" Instead of answering me, he asked me "Will you buy them?" "No," said I, "but I would like to eat them; they are of excellent flavour." "That may be," he replied, "but I don't want to eat them, and I can't sell them." He added that he had had them there for weeks.

It is not much use for me to specify the varieties by name which the London market will take, as peaches, unlike other fruit, are not much known in the market by their names, but rather by their appearance and quality.

The market requires a fairly large peach, with white flesh, round in shape, and with as much colour as possible; it must not have a point and must be juicy. Colour without size will not avail. Size and colour must be combined in a perfectly saleable article.

Packing.—The packing during the past season was as usual good. Some shippers, however, packed in boxes which were too frail, which

caused them some loss, as these boxes could not stand the journey. Some complaints were also made about the coarseness of the wood wool used by some packers.

A few packers again tried the French method of packing in cotton wool, but this did not prove altogether successful, the fruit thus packed not having arrived in good condition. Experience shows that cotton wool packing is not suitable for a long journey. It is too dense and does not allow the cold air to get to the fruit soon enough to retard the process of ripening. The best method of packing is that which has for a long time been adopted by the Cape packers: that is in trays holding from 16 to 24 fruit, strong enough to carry the fruit; each peach to be wrapped in suitable paper and packed in soft white wool of the best and finest quality. To save market dues and to facilitate handling three trays should be battened together.

Grading.—The Government's official grades should be carefully followed. Only fruit of uniform size, shape, ripeness, quality and colour should be packed in each tray. Each tray should be fully filled with the fruit; complaints this season included instances where one or two fruits less than the number indicated were included, and where fruits differing over an inch in diameter were included in the same box, and where only 18 were packed of a size, of which 24 could have been sent in the same box, the rest of the box being filled with wood wool. The fruit in every box of the similar grade and mark should be identical.

NECTARINES.

The shipments of nectarines during the past season amounted to 2,191 boxes, as against 762 for the previous year. This increase was very welcome, though the demand on the London market is not nearly so great as for peaches. The more colour, the better it is appreciated. There is no objection to the yellow-flesh nectarines; these are known as the Golden nectarine, and are rather sought after. I hope the gradual increase in the number of shipments will continue.

The first consignments arrived during the latter part of January, and shipments were received until about the middle of March. The early arrivals made about 10s. to 20s. per boxes of about 20 to 26; afterwards they were being sold at 8s. to 16s., sometimes up to 20s. per box. The prices were well maintained up to the end of the season. The average prices for the season would be from about 7s. to 13s. per box.

The fruit generally arrived in good condition, and a bad box of nectarines is rarely seen on the market.

Packers must, however, be very careful about the grading. All fruit in each box must be uniform in size and colour; they could be packed in trays or boxes of 24 to 28, wrapped in paper, and a little wood wool should be used, but it must be of the finest and best quality; three trays should be battened together.

PLUMS.

The total shipment of plums for the past season amounted to 32,184, as against 15,047 for the previous year. This large increase was not too much for the market to take. The favourite varieties were much sought after and made good prices. The markets are widening and the demand is increasing for this fruit.

The first shipment arrived during the third week in January, and the last shipments at the end of April.

The prices at the commencement of February were "Burbanks," 3s. to 4s.; "Wickson," 4s. to 7s.; "Satsumas," 8s. to 10s. The following week "Burbanks" were making 1s. 6d. to 2s.; "Wicksons" 2s. 3d. to 4s. 6d.; "Satsumas," 6s. to 10s.; "Apple Plums," 7s. to 10s.

At the commencement of March "Wicksons" were 3s. to 4s. 6d.; "Kelseys," 5s. to 8s.; "Apple Plums," 7s. to 8s. 6d.; "Satsumas," 5s. 6d. to 6s. 6d.; Chalcott's, 4s. to 5s. 6d.

During the latter part of the season the shipments were comprised almost entirely of "Kelsey" and "Apple Plums," which were being sold at 5s. to 7s. and 8s. to 11s. per box respectively.

The average prices for the past season for the different varieties may fairly be stated as follows:—

"Apple Plums," 7s. to 10s.; "Satsumas," 6s. to 8s.; "Kelseys," 5s. to 7s.; "Chalcots," 4s. 6d. to 5s. 6d.; "Wicksons," 3s. 3d. to 4s. 6d.; "Burbanks," 2s. to 3s. These prices were for sound and fairly sound fruit. It is impossible to record the prices of wasty and over-ripe fruit.

It will be seen from the above figures that the two dark flesh varieties—"Apple Plums" and "Satsumas"—are easily first; they are much liked both for their flavour and attractive appearance, but it must be borne in mind that the quantities of shipments of these varieties were very small compared with the others. If large shipments of these were to come forward, the prices would fall to some extent. I am glad, however, to record that the quantities of the "Satsuma" shipments have increased.

The next favourites are the "Kelsey"; they are always a good plum for this market; they travel well, have a bright and attractive colour, and are of good size and flavour. "Wicksons" are also fairly attractive in colour, and are of good size, but of very poor flavour, besides which they usually arrive out of condition, either too green, or else over-ripe. When sound, they are deceptive to the consumers. Whenever I hear anybody complaining about having bought Cape plums and found them to be of unpleasant flavour, I know they have had "Wicksons."

As to "Burbanks," I can only repeat what has frequently been said by myself and by the agents of the growers on this side, *viz.*, that they are not suitable for this market. They are not liked, and, moreover, spoil the good name of Cape plums, besides which they frequently arrive in a

bad condition. I feel sure that the shipments of the past season did not pay for the freight and packing.

The following other varieties were also included in the shipments:—"Chalcots," "Ogan," "Shiro Simoni," "Sultans," and "Jeffersons," but I am not in a position to express an opinion upon these. I would merely say that growers should satisfy themselves as to which are the two or three most suitable varieties for the market, and if they can grow these successfully on their farms, to confine themselves to them.

The packing of plums is more simple than that of other fruit; they should be tightly packed with as little wood wool as possible, wrapped in fancy paper, well graded, and in counts of from 24 to 36. Three boxes should be battened together.

(To be continued.)

Diseases of Poultry.

SOME USEFUL HINTS.

AN American contemporary, in a recent issue, gives some useful hints on the treatment of various diseases of poultry which should be found of value by poultry raisers in this country. We reproduce them just as originally published:—

An ointment of vaseline and sulphur is a good one for scaly legs.

The best tonic you can give your stocks is fresh air and exercise.

Disinfect, if possible, once a week. It is the only way to kill disease germs.

For canker on fowls alum water is recommended. Put alum in the drinking water.

It is a noteworthy fact that the cry of "cholera" comes from sections where corn is the main diet.

A cure for sore head is bathing with salt water and afterwards anointing with carbonised vaseline.

Disease comes to many flocks through the drinking vessels. Disease lurks in filthy water fountains.

Another cure for sore head or chicken-pox is an ointment made of two parts lard and one part kerosene.

Cases of croup have been greatly benefited by placing a little bromide of potassium in the drinking water.

Salt aids in the performance of the various functions of the body, as digesting the food and its absorption by the blood.

There is nothing better for a recently contracted cold than a one-grain quinine pill given each night for three nights in succession.

For sneezing and slight colds a simple remedy is a tablespoonful of kerosene in the drinking water, to be repeated for several days in succession.

For limberneck a teaspoonful of sugar dissolved in a wine glass of water, a lot of which is squirted down the throat of the afflicted fowl, is recommended.

While we are opposed to giving a well fowl medicine, we can see no reasonable excuse for allowing the first symptoms of sickness to develop into disease.

It is said by those who have tried it that gin and molasses, equal parts, put in a bottle and well shaken before using, is an excellent tonic and preventive of colds and roup.

The United States Department of Agriculture recommends in warding off corn and an increase in the proportion of meat food in the daily ration.

If the droppings of the fowls are not in normal condition give a teaspoonful of soda water (bicarbonate) to each afflicted bird. In making the water use three heaping teaspoonfuls of soda to a pint of water. Follow with a one-grain quinine pill each night for three nights in succession.

If you have had contagious disease among your fowls do not overlook the importance of thoroughly fumigating the premises, for if you start over again with a new flock and have not taken care that the houses and yards are entirely rid of any traces of the disease you might as well give up any hope for success.

The papers and reports of the International Congress of Agricultural Associations and of Rural Demography will form eleven volumes, which will be supplied to all members of the Congress. The amount of the subscription (15 francs, equal to 12s. 6d.) should be sent to Mr. Vandervaeren, 220, chaussée d'Alsemberg, Brussels. Agricultural societies, public libraries, agricultural colleges and individuals engaged in practical work will find in these volumes a resume of the progress of agricultural associations throughout the whole world. After the Congress the volumes will only be obtainable at library prices.

Feeding for Egg-Production.

It cannot be denied that there has been a great improvement in poultry in Natal during the last two or three years, and this is undoubtedly due to the increased attention which the farmers have given to the feeding, housing, and general management of the birds. However, it should be borne in mind that there is always room for improvement in our birds; and that we still have a deal to learn about them. It has practically become an accepted fact amongst poultry-keepers that over-feeding is one of the most dangerous practices, as well as an extravagance, and it is practically fatal to egg-production. A recent issue of the *Monthly Hints on Poultry* contains a useful contribution on the feeding for egg-production. The author states that to his mind a precise definition is required of over-feeding in order to prevent the cautious poultryman proceeding to the other extreme, as the evils attendant on under-feeding are too obvious and patent to all.

The author proceeds with saying that: "It has been my intention for a considerable period to bring this matter of feeding for egg-production more prominently before the public. Possibly it is the report of the Utility Poultry Conference at the Hawkesbury Agricultural College, New South Wales, which has just reached me, that has evoked these comments on a question of vital importance to all utility poultry-keepers.

"At the Hawkesbury Conference, Mr. A. E. Henry spoke on the question, 'Can Laying Hens be Over-fed?' Thanks to *The Australian Hen*, I am able to give a resume of his remarks and the subsequent discussion."

In discussing this subject, Mr. Henry said he would assume that all the hens were under $2\frac{1}{2}$ years of age. Birds over this were always unprofitable as layers.

Crompton, whose work on poultry was the most pretentious ever published in Australia, asserted that with discrimination it is impossible to over-feed laying hens if a full egg-basket is required. He had tried this and proved it, and had always found the "full and plenty method" a great success.

He told of a breeder whose wife grumbled at the amount of feed the birds consumed. He turned the fowls which were in full lay over to her, with the result that, with lessened food, they had gone right off in ten days, and it took him just ten days to get them back to full lay again.

We were told that heavy feeding made the hens too fat to lay. As a matter of fact, hens got too fat because they did not lay. His own experience proved this. Some very fat hens were most prolific producers. Over fatness was a consequence of poor laying, not the cause of it.

Judgment must be exercised in the use of common foods. Maize is the most relished food, and if allowed the birds would over-gorge themselves upon it. Too much fatty and starchy food must not be used continually, but maize could be given freely to hens on free range. It would be found necessary to study the surrounding conditions.

He favoured the following ration:—

Morning: Three parts (by measure) pollard; two parts scalded lucerne chaff; one part lean minced meat.

Midday: Greenstuff. Night: Maize and wheat.

He considered that the great majority of laying hens were under-fed.

In reply to questions he said:—

He fed grain raw because it was a great advantage to the gizzard to have hard work to perform, and this would stimulate egg-production.

There could be no given quantity of food for a given number of hens, but as much as you could ram down their throats.

Birds fed according to owners' ideas, and not by appetite, would not give satisfactory results.

If bran were given it would be better scalded.

He would not feed millet seed, except for the purpose of promoting exercise.

The object of scalding grain was to give warmth and partly digest it.

Boiled barley was a splendid food.

The author states that, from the foregoing, he cannot form any other conclusion but that Mr. Henry, by experience, is arriving at the same opinion as himself regarding full feeding for egg-production. He feels, however, that some of his remarks might be more amplified, as in their present somewhat curt aspect they are calculated to do much harm if interpreted literally.

"There could be no given quantity of food for a given number of hens, but as much as you could ram down their throats."

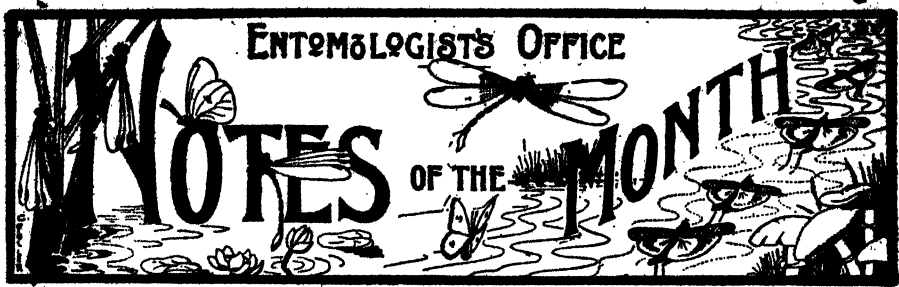
Surely the generic term "hens" includes "pullets," and, as no mention is made of the period when this ramming season is to be adopted, it can be taken to include pullets just arriving at maturity. Such a procedure in these circumstances would be positively disastrous, and instead of over-fatness being the consequence of poor laying it would undoubtedly be the direct cause.

My opinion is that there is a specific time for heavy-feeding, and experience has already endorsed that opinion, the time being when the birds have commenced laying; but prior to that event they must be fed with care, otherwise over-fatness will ensue, and laying be retarded or prevented.

Hens and pullets should be brought on to lay gradually, and only then should the most liberal diet be accorded them, the food employed being of an egg-producing nature.

The writer continues by saying: "I have used the expression "food of an egg-producing nature," and I wish to emphasise this in contrast to "food of a fat-producing nature." We are aware of advertised foods that are calculated to perform every call of nature, whether growth, exhibition, egg-production, or market flesh is the desired result. Many have experimented with them, and to-day on farms where they are still in use it is for one specific purpose and not as a panacea for all ills; and whilst I am distinctly of opinion that heavy-feeding is the correct thing when the birds are in full lay, I am equally emphatic in discouraging the use of fattening foods and advocate those only that are beneficial to egg-production. "Cereals alone cannot produce eggs. Animal food, either natural where the birds have free range or artificially supplied where such conditions do not exist, is essential. Again, some cereals are better than others when a full egg-basket is required, wheat and its products undoubtedly being the best. On the other hand, were I desirous of fattening poultry I would prefer barley and its products. Each and every one has its specific purpose, and the poultryman that accepts this suggestion and discriminates between them is the poultryman that will speedily attain the front rank of the industry. In conclusion, I hope these thoughts, which at the moment are not generally accepted by poultry-keepers, may be provocative of others expressing their views on the subject for the edification of all."

GUINEA FOWLS.—One plan which has been found successful in raising guinea fowls is practised by turkey raisers. The guinea and turkey eggs are set at about the same time, and when hatched the young are divided into flocks of half "guineas" and half turkeys and given to the brood hens. When this is done the guinea fowl will always remain with the other birds, and will not be nearly as wild as if kept alone. The feed may be practically the same as for young turkeys. Keep up this method of feeding for three weeks, then put them on free range, feeding three times a day, with plenty of fresh water easy of access. The guinea fowl, if thoroughly known, should bring a good price on the market, especially during the game season. Guinea fowls mate usually in pairs. A single guinea male should never have more than two hens; better with only one. They are apt to wander long distances from home, and they prefer to roost in trees and on fences, having an aversion, seemingly, for the poultry-house. They can be enticed to roost near home if they are fed regularly each night near the premises. They can be fed the same food that is supplied to other chickens.—*Agricultural Gazette* (London).



Harvest Mites.

THERE does not seem to be much that is relevant between such questions as to whether certain ticks, like Peter Pan, never grow up, whether certain grass pollen is poisonous, or whether locusts carry East Coast Fever ticks. Yet when the circumstances and conditions which give rise to these questions are followed to their logical conclusion it is found that they all turn upon one phase of Nature's economy.

A question propounded to me quite recently called to mind those enumerated above. I was asked whether the small ticks with which one frequently becomes invaded whilst walking through the veld were one particular species which never grew any larger—a very popular belief among some people who will tell you that whilst they are frequently bitten as often as not they do not see the ticks.

A little while ago a friend, deploring the spread of East Coast Fever, asked me if I did not think it possible for locusts to carry the transmitting agent, as he had often seen ticks—red ticks—clinging to the wings and bodies of locusts.

It is some years ago now since a gentleman asked me if the grass pollen was not poisonous at certain seasons of the year. He told me that it appeared to him to be so and to produce an effect just like the bites of young ticks, with which creatures he was sufficiently well acquainted.

The invisible ticks, "which belong to a species that never grows any "bigger," the "ticks upon locusts," and the "poisonous pollen grains" are harvest mites, minute creatures whose exact nature and revolting appearance are, whilst still very young, only revealed by the microscope. The irritation caused by these minute creatures is very much that of a tick bite, so far as I am aware, but it is quite possible that more aggravated troubles have occurred which have been assigned to other causes, because in Europe and America far more grave results than merely temporary inconvenience have resulted from such attacks.

Although ticks are giant mites, mites are not ticks. Our harvest mites are the young of certain mites belonging to the genus *Trombidium*.

and have a natural affinity to the cheese mite, and the mange and scab mite. Together with the ticks, they are grouped under the order *Arachnida*, in which are also ranged the spiders and the scorpions. The members of this order are differentiated by several characters from insects, but the most prominent of these is the fact that the Arachnidans possess eight legs against the six of an insect. At the same time it has to be borne in mind that in their first stage of active existence ticks and mites have but six legs, an extra pair being acquired after the first moult when the creature enters the nymphal or that intermediate stage between the larval and the adult, when, whilst apparently mature, the sexual differences and characters are still occluded. The nymphal period is also seen in the development of locusts and bugs among insects, and is represented by the remarkable resting or pupa stage of butterflies, moths, beetles and flies.

In America harvest mites are also called "Chiggers," this term like "Jigger" being a corruption of Chigoe. As we have the Chigoe or Jigger flea in Natal, it is not at all desirable to apply the term to harvest mites.

The Trombidian mites, of which harvest mites are the larvae, are usually of a scarlet colour, and some, notably a Cape species, quite large and conspicuous. In the adult stage they are predaceous, wandering about and feeding upon insects, one species being known to feed upon the eggs of locusts and grasshoppers. The eggs are laid in or upon the ground, sometimes to the number of 400 in one place. The microscopic young which hatch from these eggs are parasitic upon insects, and when more grown are familiar to most of us owing to the frequency with which they are seen upon the under-wings of locusts, upon house flies and about the bodies of many other insects.

Their attack upon mankind and warm-blooded animals is misjudged, as the proceeding invariably results in their premature death.

In a recent bulletin (Ohio, 1909), H. A. Gossard says: "Last year, threshermen, harvest hands, workers in potteries, and apparently all classes of labourers who were obliged to handle straw in any way, suffered intensely from the attacks of harvest mites. Horses stabled under mows in which infested straw had been stored were in many cases rendered frantic by the irritation caused by these minute creatures. They often occur in immense numbers in grain straw, sometimes causing sickness, and even death has resulted directly or indirectly from their attacks."

In Circular 77 of the United States Bureau of Entomology, from which some of the foregoing information concerning harvest mites is drawn, Chittenden makes the following observations upon the attack of harvest mites:—"Soon after the harvest mite burrows under the human skin, a small, red spot appears (evidently the mite itself gorged with human blood), after which the surrounding surface becomes congested, the affected area spreading until it is from less than a quarter to half or

three-fourths of an inch in diameter. This congestion may manifest itself within less than an hour after exposure, or may not be apparent for twelve hours or so, the fever being at its height usually on the second day. The symptoms are apt to be first noticed when the sufferer has removed his clothing at night, or upon awaking from sleep. . . . The feverish appearance of the afflicted skin area varies according to the susceptibility of the person attacked. Children experience more severe annoyance than adults, and young women as a rule suffer more than older persons. . . . Many persons . . . seem to be practically proof against the toxic effects of harvest mites and go with impunity into places overrun with them. This immunity to poisoning is obviously due to two causes: (1) To outdoor work, which toughens the person's skin, especially such portions of the arms and legs as are much exposed to the sun and weather; and (2) to inoculation, due to frequent infection

"The mites naturally attack those portions of the body which are most exposed—those nearest to the ground. They crawl into the stockings and penetrate the skin about the ankles, frequently below the shoe tops, and are usually found most numerous below the knee. According to the late Dr. John Hamilton, a physician as well as an entomologist, the harvest mites enter the larger sweat tubes or pores of the skin, and, as these tubes are very tortuous, the progress of the mites is necessarily slow, from eighteen to thirty-six hours being required for them to reach the end. When the lesions caused by these mites are unusually numerous, the sufferer becomes feverish, and sleep is much disturbed. Sometimes the afflicted one becomes frantic and lacerates his flesh by too vigorous and frequent scratching. Erysipelas is known to follow severe attacks, and death resulting from blood poisoning is recorded. These more serious results of infestation are, however, exceptional, and, as with the fatalities which in rare case follow the ordinary merely painful or annoying 'bites' of many insects, undoubtedly point to an impurity of the blood."

In the case of infection, moderately strong ammonia applied when the symptoms are first manifest is said to offer the best results, and a dilute tincture of iodine or collodion applied lightly to the affected parts is said to be a good remedy in case of severe suffering.

C. F.

Sound legs are not likely to be transmitted by an unsound horse. Therefore, look well to the breeding of your stock. There are already enough knock-kneed, ringboned horses on the market.

Susceptibility of Dairy Cows.

SOME ENGLISH EXPERIMENTS.

THE management of a herd of dairy cows so as to derive the maximum yield of produce at the minimum of outlay, and at the same time to maintain them in perfect health, is a subject of unfailing interest at the present time on account of the growing importance of this portion of the farmer's business. Scientific experiment has only of recent years been brought to bear on this matter, and yet it is a field of inquiry of the utmost importance to practical men who have not the means of carrying out trials of various foods and methods of management for themselves. There is no doubt whatever that vast sums of money, in the aggregate have been thrown away by dairy farmers by the use of expensive foods which are not exactly suited to the object in view, but when we consider how easily the yield and quality of milk is affected, not only by food, but by external conditions, it is not wonderful that such errors should be made.

Writing on the the subject in a recent number of the *Live Stock Journal*, a contributor signing himself "Spero" gives it as his opinion—an opinion that will be subscribed to by many—that one of the most valuable conclusions which have been arrived at by repeated experiment is that a limit is soon reached in the feeding of dairy cows beyond which it does not pay to go. If a cow is to go to the butcher as soon as her milk drops to a certain minimum, very high feeding is, of course, the right thing, as the dairyman gets extra yields of greater richness, and is at the same time preparing his animal for market. But when a cow is being kept on from year to year, to overfeed her has been proved to be a great mistake. You may force a greater yield, but it will cost more than it is worth. The limit of profit is reached when the cow is kept in good, healthy condition, and the drain on the system duly balanced.

"Spero" then goes on to summarise and comment upon the latest reports of the Agricultural Department of Armstrong College, Newcastle-on-Tyne, containing the results of various experiments in milk production, and as what he has to say will possess a considerable amount of interest for South African farmers, we make no apology for reproducing his remarks here.

Incidentally, he says, *inter alia*, referring to the reports in question, some details are given of the effect of weather changes on the flow of milk and its quality, and they are eloquent as to the wonderful sensitiveness of the lacteal organs of the cow to outward impressions. The following brief extract is a fair specimen of a voluminous collection of facts on this

point:—"A strong west breeze was blowing on March 4th and 6th, but this moderated on the 7th, and the fat contents of the milk increased 1·7 per cent. that afternoon over the previous afternoon. The cows had been out about five hours on each of these days. On April 5th and 8th there was a comparative calm after wind, and on each of these days the afternoon's milk had $\frac{1}{2}$ per cent. more butter-fat. On April 11th a strong north-west wind was blowing, and the fat went down by 0·3 per cent."

The careful experimenter is modest and seldom dogmatizes on the lessons taught by his work. He discovers facts and lays them before readers, who are left to draw their own conclusions as to how best to apply them to their own practice. Many dairy farmers make a practice of turning out their cows every day for a few hours in winter as well as summer. In so doing they are doubtless obeying the laws of health, but sacrificing to some extent their immediate returns.

In the same way the effect on the flavour of milk and butter of certain changes of pasture is immediate and sometimes highly detrimental. Brewers' grains are very largely used by dairymen, and their effect on the yield is so apparent as to need no experiment to prove it. They do undoubtedly increase the flow very considerably, but those who use them will do well to take special note of the percentage of butter-fat, for that this will sink under the influence of the grain diet is as certain as that the mere quantity will rise. The following experiment may be stale news to some, but it will do no harm to reproduce it. Two lots of five cows each were fed with the same quantities of maize meal, Bombay cotton cake, chopped straw and hay; but lot 1 had 60 lbs. swedes in addition, while with lot 2 this was reduced to 20 lbs. and 20 lbs. brewers' grains were added. The effect on the average of yields for eight weeks was fourteen pints per day more milk from those having grains, but the percentage of butter-fat fell considerably, especially in the morning's milk, which went down 0·53 per cent., that of the noon milking 0·10, and that of the evening 0·23 per cent. It may thus easily be that, where the richness of the milk of a herd is dangerously near the border line of 3 per cent. of butter-fat adopted by the Board of Agriculture as the minimum standard, the use of grains may bring trouble to the dairy-farmer. On the other hand, if the breed of his cows or the quality of other food given brings his ordinary richness to 4 per cent. or over, it may pay well to use a moderate quantity of brewers' grains. It must never be forgotten, however, that the composition of the milk of the individual cows in a herd varies greatly, and it would answer the purpose of the owner to suit the rations so as to discriminate between them as far as possible.

Wherever civilised man resides, sheep thrive well if properly cared for.

Agricultural Legislation.

FURTHER ACTS PASSED DURING 1909-10 SESSION.

THE following Acts have, in addition to those referred to in our last issue, been passed by Parliament and have been promulgated in the *Government Gazette*, viz.: Act No. 18, 1910, "to amend the Game Act No. 8, 1906"; Act No. 19, 1910, "to amend the Indian Immigration Act No. 17, 1895, and Act No. 2, 1903"; Act No. 20, 1910, "to authorise loans by Government for the construction of dipping tanks and the erection of fences and to extend the provisions of the East Coast Fever Acts"; and Act No. 23, 1910, "to enable purchasers of Crown lands to suspend payment of the instalments of purchase price upon suitable terms." We give herewith the main provisions of these Acts:—

ACT NO. 18, 1910,

"To amend the Game Act No. 8, 1906."

1. A Magistrate shall, upon application by any landowner in his Division, grant him a permit for the destruction of hares upon his land during the close season of any year.

2. The Klipspringer shall be transferred from Schedule B to Schedule C of the Game Act No. 8, 1906.

ACT NO. 19, 1910,

"To amend the Indian Immigration Act No. 17, 1895, and Act No. 2, 1903."

1. Notwithstanding the provisions of Section 6 of Act No. 17, 1895, it shall be at the discretion of the Magistrate of the Division in which the woman resides to relieve any Indian woman from payment of license money upon the grounds of ill health, old age, or for other just cause.

2. It shall be lawful for the Indian Immigration Trust Board to establish a bureau for the purpose of registering unemployed Indian labourers within the Colony of Natal.

3. The payment of arrears of license money, due, under Act No. 17, 1895, by any Indian, shall be suspended during the period of a re-indenture or contract of service for a term of not less than two years, and in the event of his return to India at the expiration of such contract or indenture payment of arrears shall be waived.

ACT NO. 20, 1910,

"To authorise loans by Government for the construction of dipping tanks and the erection of fences and to extend the provisions of the East Coast Fever Acts."

1. The Minister of Agriculture may, upon application, make loans to

owners of land, or to lessees or other occupiers of land, to assist them in constructing dipping tanks for cattle and in erecting fences within the boundaries of their farms. Any person other than an owner must furnish approved security for the proposed loan. The Minister may, in place of making a loan for purposes of fencing, supply fencing material, and in such case the price charged by the Government for such material, together with all cost of carriage and incidental expenses, shall, for the purposes of this Act, be deemed to be a loan. An account certified by the Chief Accountant of the Department of Agriculture shall be sufficient evidence of the amount of such loan. The regulations under this Act may prescribe all details and procedure in connection with the granting of loans, but no loan for the construction of a dipping tank shall exceed £100, and payment will not be made until the tank is satisfactorily completed and ready for use. The word "owner," as used by this Act, means a registered owner or the holder under certificate of sale or allotment of land bought from the Government.

2. All such loans shall be repaid, together with interest thereon at the rate of five per cent. per annum, by thirteen equal yearly instalments, the first payable two years after the date on which the loan is made or the fencing material is first supplied by Government, subsequent instalments being payable at the end of each period of twelve months from the due date of the first instalment. Nothing in this section shall, however, prevent a borrower from paying off his whole liability, with interest to date of payment, at any time if he should wish to do so.

3. In the case of a loan to an owner, the unpaid instalments, with interest, shall be payable by the owner for the time being of the land upon which the dipping tank was constructed, or the fencing erected, for which the loan was made. Every such owner shall accordingly be liable for the instalments and interest as they fall due in the same way as if the loan had been made to him, and he shall be entitled to recover any sums which he may have paid from the person to whom the loan was actually made unless such claim has been mutually adjusted in the price of the land or otherwise. In the case of a loan to a tenant, he and his successors in the tenancy shall, together with the sureties, be liable for the instalments falling due during the tenancy and for the interest thereon, and any further instalments with the interest thereon, shall be payable by the owner for the time being, in accordance with the provisions of the first paragraph of this section.

4. (1) Section 6, and the reference thereto in Section 11 of Act No. 32, 1908, are hereby repealed.

(2) The Minister, acting with the Advisory Commission established under this Act, may by notice in the *Government Gazette*, divide any Magisterial Division into two or more districts for the purposes of this section.

- (3) The Magistrate of any Division shall, upon receiving a requisition signed by not less than fifteen persons, being registered voters and owning cattle in the Division, or in any such district as aforesaid, call a meeting of cattle-owners, being registered voters of the Division or district as the case may be, to consider the question of enforcing the dipping or cleansing of cattle.

- (4) Notice of the time and place appointed for the meeting shall be published four times in some newspaper or newspapers circulating in the Division, the first notice being published two weeks at least before the appointed time.

The Magistrate or his deputy shall preside at the meeting. Any person being a registered voter and owning cattle within the Division or district, as the case may be, may attend and vote at the meeting.

The meeting may be postponed to a convenient date, if necessary, on account of stress of weather, or for any other reason which the Magistrate may consider proper. Notice of such a postponement of the meeting shall be published as aforesaid at least twice.

- (5) If the meeting be attended by not fewer than thirty persons entitled to vote (of which the Chairman shall decide), and a resolution be passed by the majority in favour of compulsory dipping or cleansing, the Magistrate shall report the same to the Minister, who shall thereupon issue an order making it compulsory for all cattle within the Division or district, as the case may be, to be dipped or cleansed in such manner and at such intervals as he may prescribe, and such order may be enforced by the several Advisory Committees within the Division or district, or by any persons whom the Minister may direct to execute such order.

If the meeting be not attended by the prescribed number of qualified persons, or if such resolution as aforesaid be not passed, the Magistrate shall not be again required to convoke a meeting within the next three months.

- (6) For the purposes of this section, every municipal borough or township established under Law No. 11, 1881, or a like Act, shall be regarded as a district within the meaning of the preceding sub-sections, and the remainder of the Magisterial Division in which such borough or township is situated shall be treated as if it were an entire Division.

- (7) In every borough or township in which a resolution has been passed, and an order made by the Minister as afore-

said, the Town Council or Local Board shall be required to construct and maintain so many good and sufficient dipping tanks for cattle as may, in the opinion of the Principal Officer of the Veterinary Department, be required for the dipping of cattle in such borough or township.

Should any Town Council or Local Board fail to construct the required number of tanks within a time to be notified by such officer after the issue of such order as aforesaid, or to maintain them ready and fit for use, the Minister shall be empowered to construct such tanks or to repair or maintain them, and the expense incurred shall be recoverable from the Town Council or Local Board.

- (8) The Natal Native Trust shall, in like manner, be required to erect and maintain dipping tanks in any Native Location or Mission Reserve whereof they are trustees, situated within a Division of District in which a resolution has been passed and an order made as aforesaid.

5. The Governor in Council shall, in the month of March in each year, or so soon thereafter as may be, appoint five persons having a practical knowledge of cattle-farming, and not being in the Government employ, to be an Advisory Commission, the function whereof shall be to offer advice to the Minister upon any subject connected with the administration of the East Coast Fever Acts and the suppression of the disease. The Commission may elect its own chairman.

6. Sub-section (a) of Section 1 of Act No. 32, 1908, is hereby repealed, and in place thereof is enacted the following sub-section:—

- (a) To require any person to erect one half of such boundary fences on his farm or land as they may direct, and to keep the same in good order and repair. The fences shall be of such a kind and standard as the committee may prescribe, but not of more expensive character than those required by the Fencing Laws Nos. 30 and 36, 1887.

7. The Governor may from time to time make any regulations required for the purposes of this Act.

ACT No 23, 1910,

"To enable purchasers of Crown lands to suspend payment of the instalments of the purchase price upon suitable terms."

1. The words "purchaser of Crown lands" and any like expression used in this Act means the lawful holder, under certificate of sale or cession thereof, or lands sold by the Government under the system of deferred title and payment of the price by annual instalments. References to purchase or sale include an allotment or other disposal of Crown lands under the said system.

2. The Surveyor-General shall, at any time after the payment of the first instalment, upon written application being made to him by a purchaser of Crown lands, grant to such applicant permission to suspend payment of the annual instalments of the purchase price, subject to the following exceptions and conditions:—

- (a) Application must be made before an instalment shall have been in arrear for three months, otherwise the Surveyor-General may, if he thinks proper, refuse to allow the suspension.
- (b) No such permission shall be granted unless the purchaser satisfies the Surveyor-General that he has fulfilled the requirements of his certificate of sale in regard to residence and occupation of the land.
- (c) A purchaser shall not be entitled as of right to obtain such permission after proceedings at law have been commenced for enforcing any of the conditions of sale.
- (d) Every instalment so suspended shall carry interest at the rate of five per cent. per annum from the day on which it became due, and the interest shall be payable to the Surveyor-General yearly or half-yearly as may be stated in the permission.
- (e) Upon any failure to pay interest the permission to suspend payments may be revoked, and thereupon the conditions of the certificate of sale in regard to the failure to pay instalments shall at once become enforceable as if no such permission had been given.
- (f) In no case shall the granting of permission to suspend instalments relieve the purchaser of any of the other obligations imposed by the certificate of sale, nor shall he have any claim to receive registered title to his land until he has paid all instalments and interest and has in every respect carried out the requirements of the certificate of sale.

Should the Government remit the condition of occupation for any period, the purchaser must, before receiving title, make up a further period of such occupation equal to that which has been remitted.

3. Any arrangements made with the purchaser of Crown lands before the passing of this Act, under which he has been allowed to suspend payment of instalments, shall continue in the same way and subject to the like conditions as if the permission had been given under this Act.

4. If a purchaser of Crown lands allows any instalment to be in arrear and unpaid for more than three months without having obtained permission for the suspension of payment, every such instalment shall carry interest at the rate of six per cent. per annum from the date of such

instalment up to the time when permission to suspend payment is granted, and such interest shall be payable to the Surveyor-General at the end of every six months, beginning from the due date of the instalment.

5. No purchaser shall be entitled to tender payment of any instalment or interest unless he produces the proper proof of compliance with the conditions of sale, nor shall he be in any way relieved from any obligation or liability under the conditions of sale if payment should in any case be accepted while such conditions remain unsatisfied. In any case in which occupation of the land forms one of the conditions of sale, the occupation must be such as constitutes a reasonably sufficient utilisation of the land, having regard to its extent and character, as well as to its situation and any natural circumstances affecting its use. In the case of land held by a European, occupation by Indians or Natives shall not be deemed to be occupation within the meaning of the certificate of sale.

An uneven flock of sheep is even more valuable than an even flock of poor ones.

A bacon pig should mature in about seven months, and it should turn the scale, "dead weight," at about 12 stone, or 168 lbs. This size represents a live weight of from 15½ to 16 stone, and may generally be regarded as fetching the highest price for bacon-curing purposes.

HINTS FOR DAIRYMEN.—Study the composition of feed-stuffs, and compare the relative amounts of digestible protein, carbohydrates and fat contained in each. Study the individuality of the cows, and formulate a ration for each individual cow that will be suited to her needs. Endeavour to grow all the feed-stuffs possible on your own farm, and seek especially to produce those feeds that are rich in protein. Provide a succulent feed for your cows throughout the entire year by either growing green forage and pasture which may be used continuously, or by providing yourself with a silo in which you may store green feed which can be used throughout the year as desired. The average herd of dairy cows is handled at a great loss financially. Those producing a fair yield return a small profit, while those producing a maximum yield are money-makers. The evil is largely an outgrowth of not giving the cow an opportunity to demonstrate her worth.—*Agricultural Gazette* (London).

Natal Bee-Keepers' Association.

MONTHLY NOTES AND COMMENTS.

By W. C. MITCHELL, Hon. Secretary, Cedara.

ALL matter intended for publication in these columns should be forwarded to the Honorary Secretary, Cedara. It is hoped that members will avail themselves of the opportunities afforded by their official organs of discussing any matter of interest connected with apiculture. Any correspondence of this nature serves an educational purpose, and this is one of the objects of our Association.

* * *

There are still many bee-keepers in Natal who have not joined our ranks. The Annual Show of the Association is to be held in June, at the same time as the Show of the Royal Agricultural Society. All bee-keepers should join and support the Association by exhibiting.

* * *

Reports coming to hand reflect that some of our members anticipate quite a good honey harvest; others again are the reverse. Is this locality or management? Probably both!

* * *

The contribution by "H. R.," entitled "No Blue-Bag," is opportune: from some quarters news of bees displaying bad temper comes to hand. It may be as well here to add that ladies, if stung on the hand, would be wise in removing all rings from their fingers. Cases have been known where these have had to be removed with a file to prevent mortification.

* * *

In my December notes I gave a copy of the recent Act applying to the importation of bees, beeswax, honey, etc., and I now include the regulations which have been framed by the Agricultural Department, under the powers conferred by the said Act. They read as follows:—

Whereas by virtue of Section 1 of Act No. 15, 1909, the Minister of Agriculture is authorised to prescribe the conditions under which bees and their larvae, honey, beeswax, foundation comb, honey comb, and other unmanufactured products of apiculture may be introduced into Natal.

And whereas no such animals or products shall be introduced by land or sea save with the consent of the Minister of Agriculture, it is notified for general information that all importations of such from places beyond British South Africa are, and shall be, subject to the following conditions:—

1. Application to import bees, bee-larvae, beeswax, foundation comb, honey comb and honey from places beyond British South Africa shall be made in writing to the Minister of Agriculture before any order for the delivery of such is placed.

Such application shall be accompanied by full particulars as to the quantity and nature of the proposed importation, the place or origin, and the person or agent from whom or through whom it is proposed to import.

2. All consignments arriving shall be detained by the Postal or Customs officials pending the presentation of permit to import, and before the consignment is handed over the importer or his agent shall produce such evidence as shall be required to show that the conditions under which permission to import was granted have been fully complied with.

3. In the case of consignments arriving by post, the postal officials of the delivering office shall, upon being satisfied that the conditions imposed have been complied with, so indorse the permit issued and forward the same to the Department of Agriculture.

4. Where consignments arrive through the Port of Durban, they shall be subject to detention and inspection by the Examiner of Plant Imports or other duly authorised officer of the Department of Agriculture, to whom the permit shall be given up by the importer or his agent.

5. An examination fee of 2s shall be paid to the Examining Officer in respect of each consignment, for which an official receipt must be obtained.

6. No consignment shall be passed by the Customs Department until a certificate of inspection, to which must be attached the official receipt for the examination, has been presented for examination.

7. In the event of consignments arriving through the Port of Durban for places beyond Natal in respect of which no permit to import is presented by the local agent, the Examining Officer is authorised to detain same pending satisfactory evidence that a permit has been issued.

8. The importation of beeswax and foundation comb is further subject to the production, in the case of each consignment, of sworn declarations from the place of origin, in accordance with Forms A. and B. set forth in the annexures to this notice

ANNEXURE "A."

Form of Declaration Required to Accompany Importations of Beeswax.

[I/we] do hereby solemnly and sincerely declare that the undermentioned beeswax supplied by [me/us] to of on has been melted for not less than two and a half hours at a temperature of not less than 212 degrees Fahr., and has not subsequently been on premises, or within two miles of premises, where bee disease of any description is known to exist

And [I/we] make this solemn declaration, conscientiously believing the same to be true.

Declared at this day of 19

Before me, Justice of the Peace or other officer authorised to administer oaths

Quantity of beeswax referred to in this declaration

ANNEXURE "B."

Form of Declaration Required to Accompany Importation of Foundation Comb.

[I/we] do hereby solemnly and sincerely declare that the undermentioned foundation comb supplied by [me/us] to of on has been made from beeswax that has been melted for not less than two and a half hours at a temperature of not less than 212 degrees Fahr. and has not subsequently been on premises, or within two miles of premises, where bee disease of any description is known to exist.

And [I/we] make this solemn declaration, conscientiously believing same to be true.

Declared at this day of 19

Before me, Justice of the Peace or other officer authorised to administer oaths.

Quantity of foundation comb referred to in this declaration

W. A. DEANE,
Minister of Agriculture.

DISTRICTS REPORTS.

Cedara.—Season, at date of writing, has proved a very poor one: Yellow pollen being gathered, principally from pumpkin and chickweed. Virginia creeper and casuarina trees also a fruitful source; colour brown. No surplus honey being stored. After a considerable period, when circumstances prevented me examining stocks, I find many are on the verge of starvation.

Dannhauser.—Mr H. Martin writes: The flow is on now with me and my bees are making a splendid show, despite the weather. By the way, we had twenty-seven bee days in January, and, although there fell a lot of rain, it was mostly at night. A week ago I took twenty-two well-filled shallow frames off my two best hives, leaving more than that number behind, filled also, but not sealed, and, on looking at the frames of foundation, with which I replaced those taken away, I found them fully

drawn out and filled also in just six days. Given good weather, I should have a good season, but, of course, there is the rain, as last year, or a shower of hail to take account of. With my big hives, when I can get them up to full pitch, they go at a pace when the flow is on. (Mr. Martin uses the W.B.C.—ED.) Speaking of swarms, I have not had one from any of my hives for over two seasons, and hope in time to get over that tendency altogether.

Deepdale.—Mr. F. H. Harrington reports that ants have been giving some little trouble, but that colonies are busy brood-rearing, although no surplus is being stored owing to the continued wet weather. Yellow pollen being gathered from pumpkin. No swarms have issued to date.

Donnybrook.—Mr. Auld reports that bees in this district are having a very rough time of it. No honey being gathered except a little from pumpkin and white Dutch clover. The Association has secured three new members in this district during the past month, thanks to Mr. Auld.

Ladysmith—Mr. Buhr writes to say that his bees are "coming along like a house afire." He has succeeded in raising six selected queens and found an outlet for them. A little surplus has been secured.

Mr. Webster, also from this centre, reports satisfactorily regarding surplus, the honey flow being very fair. His neighbour's bees too are doing well.

New Hanover.—Mr. W. T. Hibbert reports that colonies are brood-rearing, but storing no surplus owing to the wet weather. A little yellow pollen is being secured from wild flowers, but very little honey. Indirectly, Mr. Hibbert has benefited from antiquated methods of bee-keeping (as favoured by other people in his district). An exceptionally large swarm visited him, which filled "two Danz hives with supers." It would appear that some "packing-case" bee-keepers had been robbing their bees, which afterwards, owing to lack of bee forage, left their homes in search of pastures new in preference to starvation. What discriminating bees to recognise the advantages of Mr. Hibbert's methods.

BEE-KEEPING IN RUSSIA.

The following article, taken from the current number of the *British Bee Journal*, will be of interest:—

"There is probably no country in Europe where bee-keeping has been carried on so extensively as in Russia. There the peasants use honey instead of sugar, and the churches make heavy demand for wax tapers. It is said that in the Government of Ekaterinoslav, in South Russia, there are nearly four hives to every inhabitant. There is a long and interesting article in the *Revue Francaise d'Apiculture* by J. Patouillet, who says bee-keeping has been known and practised in Russia from time immemorial. A traveller named Gall, who visited

that country in the eleventh century, said that all parts of Russia—the steppes and forests—abounded in hives, honey and wax. Folk-lore, chronicles, and many surviving evidences testify to the importance of this industry from an economic, domestic and religious point of view.

“Formerly Russian princes levied on their conquered enemies tributes of honey and wax, their own subjects paying taxes in the same manner. In Little Russia, before its union with Russia Proper, there existed a tithe in bees, which consisted in carrying to the Seignior a tenth part of all the honey produced in the hives. At the beginning of the eighteenth century a single forest-domain of the Government of Kiev paid the seignior annually as much as 200 barrels of honey, each barrel weighing 10 pounds (361 pounds). One understands from this why the Russian legislature (*Rousskaya pravdar*) endeavoured to protect the interests of bee-keepers by passing stringent laws against anyone injuring their industry or stealing bees. From the earliest times Russia exported honey and wax to Greece, then in the Middle Ages it supplied the Danubian towns, and later there were exports to Western Europe *via* Novgorod, Pskow, Moscow, Kholmogory, Vologda, and the White Sea. There was also a guild of “wax merchants” in Novgorod in the Middle Ages. During the sixteenth century, under Ivan the Terrible, the English living in Russia sent out of the country 800 tons of wax *via* the White Sea, and this caused a temporary stop to be put to such exportation, but in the seventeenth century 560 tons of wax were sent to Italy. The production of wax was principally confined to the South-Western Governments. Honey entered largely into the preparation of favourite national dishes, and also for the innumerable varieties of *prianiki* (gingerbread cakes) so extensively used. It was also used as a medicine in many ailments until scientific medicines replaced it. Hydromel was the ancient Russian beverage, and of this there must have been many varieties, if one may judge from about twenty different names which one comes across. There were a great many breweries making hydromel, and some of them are even in operation to this day, for it is still a favourite drink with many Russians.”

NO BLUE-BAG.

By H. R.

“Love me, love my dog.” I love my friend’s dog, but I cannot expect, though she always reads bee-notes, that she will ever love my bees. During these holidays she was most cruelly attacked by a wild colony, and I have been duly reproached for never having told what one should do on such an occasion, and for ignoring the fact that such occasions exist!

The bees, it appears, were in the roof of the verandah; the day was

very hot and their tempers likewise. They stung the dogs, and the dogs, in fits of terror, tore through the house. The hostess, clasping her baby, made for the garden, calling to her friend as she passed, "The bees! the bees!" and urging her to run—anywhere, but away from the house.

"Bees!" Why my friend knew heaps about bees, about their beauty, their industry, their workmanship, their daintiness, their cleverness. She has forgotten it all: all that she knows now is that they sting. For, tiring of the dogs, and having laid out all the fowls, they turned upon her unsuspecting self. "Why, why, why are you here?" She refused to explain, simply flicking them aside. This was the signal for a general onslaught, and they fell upon her arms, face, ankles, hair! She was paralysed with astonishment and numb with sudden pain. She bore it as long as she could, she said, and finally in despair and against all warning, fled towards the house. Here she shook the bees in handfuls from her hair—cruel, horrid, hateful bees!

Unfortunately, there were no remedies near at hand, not even a blue-bag. Not till evening did the mother return with the baby—having in her fear run miles and miles. What had disturbed them was never discovered, but it is a pity that they had not been removed from the verandah roof, put in a nice, cool hive and taught good manners.

"Now what," asks my friend, "could I have done?" "Made straight for the house, of course, and shut the door—the courage of the boldest bee ebbs at the threshold. "But they were in the house." It was quite impossible that they could be in every room at once; failing house or shed the nearest tree would have afforded some protection in its branches. Failing house, shed or tree, to lie face downwards on the veld has been recommended. This I have never tried. I own I should like to; but so far on every occasion that offered I took to my heels and ran.

P.S.—I am glad to say my friend does not hate me—but I cannot wonder that *she hates my bees!* And for the stings! Remove these, and apply strong ammonia, mosquito lotion, or Rickett's blue.

NOTE.—Miss E. A. Seager, Station House, Waschbank, has some Danz hives with supers which she is offering at 7s. each, also a No. 15 Cowan's extractor for 50s. This is a good opportunity for some of our members wishing to increase their apiaries.

The stomach of a horse is small compared to that of a cow, and the feed of the former should contain more concentrates than in the case of the latter.

Division of Agriculture and Forestry.

CROWN FORESTS.

CONSERVATION REPORT FOR JANUARY.

THE Chief Forest Officer, Mr. G. H. Davies, summarises the month's work in Crown Forests in the following report, addressed to the Director, Division of Agriculture and Forestry:—

As appropriate to the commencement of a new year, Forester Fernando has been taking stock, and has compared the timber marked in Section B, Xalingena, with the trees of four feet in diameter and over measured on an acre sample to represent the whole forest. He furnishes me with reliably tabulated data showing that forty-two such trees were found on the sample plot, against ten marked for cutting in the section, and deduces that about one quarter of the *mature* trees in forest is the safe quantity to fell for silvicultural reasons. Forester Fernando is right in his facts but wrong in his inferences: four feet of girth at breast height does not mean maturity by any means, and immature trees are marked for felling only for reasons of canopy, spacing and disease. That the ten trees per acre marked in Section B are larger than the forty-two in the sample plot is shown, in the Foresters' table, by their average content being 54 cubic feet against 38 in the sampled acre. The marked trees in the cutting section would have averaged far more if many immature had not been marked for the reasons above stated; therefore not only must the mature trees have been marked but many immature trees as well.

The Xalingena is as essentially a yellowwood forest as the Ingeli is a sneezewood and the Impetyene a stinkwood forest. In both the latter yellowwood is also plentiful, but in much of the Xalingena there is little else but yellowwood. I would here suggest to Foresters a line of observation of great interest and ultimate utility to follow during their patrols: the noting of the predominance of certain species in special localities. This should be followed up by measuring the timber—mature and immature—and counting the poles on an acre of representative bush. Heading the list with an accurate description of the locality—as no marks should be made to confound same with cutting sections—a copy dated and signed should be filed at the station concerned and another sent up. As such lists accumulate so will reliable data as to the best sources of valuable kinds of timber, and as to the conditions of soil, elevation, rainfall, etc., suited to particular species.

Forester Foster has submitted samples of the bark of the Sdunwana

tree to test for tannin, and I forwarded it to the Government Analyst. He also sends specimens of the flower, but they are scanty, and ample quantities will be necessary to establish a distinction between this species and *Eugenia cordata*. The heavy rains have destroyed the flowers, and Forester Foster finds them very scarce though it is a common species at 'Ngomi. He reports 3,000 transplants in the nursery at his station and 2,000 more to be on hand shortly, but complains that the squatters who promised to reduce their long arrears of rent by working in the nursery now hold back when their services are required. I think that these people have been treated much too leniently, and that they should be sued without the delay that action through the Clerk of the Peace has always meant. Forester Fernando received during January an order for 200 transplants of Blue Gum, but says that he has none ready at it is useless to raise them under present conditions. Access to Riverside Railway Station is cut off for forest produce by the Cape E.C. Fever regulations, and Forester reports that transport to the Natal railway sidings at Centocow and Mundi is not available at a reasonable price. Forester Foster has placed the hydraulic ram in position and working order, and finds it a great saving of expense and time.

The weather has much interfered with all field work. At 'Ngomi the preparation of timber for the Natal Police camp is greatly delayed. At Bulwer Forester Purser has been rendered helpless by rheumatism and forced to apply for sick leave. Forester Mason could not get his horse over the spruit to Hlatikulu Forest and had to get there on foot. He found the fencing work there suspended. On my enquiry, he reported that none of the poles for this were cut in Crown forest reserve. The decidars and other trees planted out at the Emkazenani above the station and along the forest ride were weeded during January, and Forester made some progress towards completion of the ride so as to make an easier approach to the gate on the Xalingana route. He also trenched fifteen insecure beacons of that forest, and Foresters Tustin and Chilvers have been attending to beacons in the Impetyene and Ingeli districts. Forester Eyles reports the completion of the fencing of Location No. 4 in Port Shepstone Division.

Several natives were fined by the Magistrate at Estcourt for non-fulfilment of conditions of forest licenses by retaining them after expiry. Forester Mason hopes that this will be a lesson to natives in the Mooi River Division, and prevent illicit cutting under cover of licenses already used, with some cock-and-bull story ready to account for exceeding the periods. Forester Leigh at Entumeni is enforcing Regulation 11 (a) of Proclamation 58, 1903, to prevent the persistent cultivation by natives close up to and into bush there. In a case tried in the 'Nkandhla Division of Zululand on the 14th January, in which a native was charged with taking wood from a leasehold without Foresters' license; the charge

was dismissed on its being proved that the accused was acting as the lessees' servant, and, presumably, for the lessees' domestic use. This is a plain proof—if such were needed—that the natural bush on such leases is reserved subject to special prescription stated in the leases, and Forester Household should have no more difficulty in enforcing his control. With regard to the failure to prove ownership of ground in the Red Hill district, all that seems to be required is proper beaconing to support plans put in as evidence, thus throwing the onus of proof upon the claimant. As the latter is usually a man of straw, this is an important protection of the Treasury against an easily raised claim involving heavy cost in survey work.

At Giant's Castle Acting Forester Boast counted 113 eland in one troop, of which about a score were calves. On the 5th January he found the remains of an eland bull, but it had been too long dead to show the cause of death. On the 8th he chased a jackal to earth, but though he stopped all visible exits was unable to kill it owing to lack of dogs. Four jackals were put up during the month. As usual, the vermin traps caught a "buck"—a vaal rhebok doe. I am not sorry to hear that she broke the trap. Forester Justin found an elephant's tooth in the Impetyene. Forester Foster reports the presence of large numbers of locust birds at 'Ngomi, and Forester Green noted them at 'Ngoya. The former's bees were attacked by large black ants—which made very short work of them—and he has had to place the legs of his hive stands in vessels holding water and paraffin. Bushbuck are reported as plentiful at several stations.

Forester Meyer, of Pongola Bush, reports floods and losses of stock thereby. Sudden floods are the very signal feature of a disforested country, and this year they are earlier than usual.

The Position of East Coast Fever.

OUTBREAKS DURING JANUARY AND FEBRUARY.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following lists of East Coast Fever that have occurred during the period 22nd January to 19th February, 1910:—

Dundee.—Outbreaks on the farms "Lyell Miran," west of main line, "Paardekop" (sub-division of "Dumain"), east of main line, "Stratford," east of main line.

Weenen.—Outbreaks on the farms "Thorn Hill," "Middleburg,"

Alexandra.—Outbreak on the farm "Glenroy," Location No. 2.

Klip River.—Outbreaks on the farms "Welgelegen" (sub-division of "Schaaip. aats"), east and west of main line, "Coolfontein," west of main line, "Waterfall No. 2" and "Darwinter," west of main line, "Matawana's Hoek," west of main line, "Berlie" (sub-division of "Brakfontein"), east of main line; "Uitkol" (sub-division of "Eland's Jagt"), west of main line, "Schoeman's Daal," west of main line, "Catherina" (sub-division of "Coolfontein" and "Schoonfontein"), west of main line, "Matawana Kloof," west of main line, "Krantz Hoek" (sub-division of "Schoonfontein" and "Paarde Knaal"), west of main line.

Utrecht.—Outbreaks on the farms "Uitvlucht," "Klipspruit," "Kruisfontein."

Krantzkop.—Outbreaks on the farms "Sweet Home," "Haartebeestefontein" (sub-division of "49" and "Doornhoek")

Lion's River.—Outbreaks on the farms "Liddesdale," west of main line, "Boschfontein," east of main line, "Sherwood Forest," east of main line, "The Forest" (sub-division of "Rooie Spruit"), east of main line.

Richmond.—Outbreaks on the farms "Oak Grove" (sub-division of "Little Harmony"), "Hamilton," "Nomkom Panza."

Leopo.—Outbreaks on the farms "Chingford," Mission Reserve, "Pampa," "Langfontein," "King's Grant," "Carnduff Glen."

Bergville.—Outbreaks on the farms "Kroon Draai," "Driel."

Umgeni.—Outbreaks on the farms "Argosy Mills (sub-division of "Hopewell"), "Mveli's Loop," Zwaartkop Location.

Umvoti.—Outbreaks on farms "Thlam-bilwa," shown on map as 30 and 31, "Wonderboom," Greytown Local Board's farm, Umvoti Outspan (sub-division of "Mispa"), "Speculation," "23," "Daas Klip" (sub-division of "Pampoennek," "Inhlamhlani" (sub-division of "Winterhoek"), "Mt. Alida," "Green Point" (sub-division of "Jagger's Veld," "Greenwich," "Umvoti Poort" (sub-division of "Welgenvonden," "Canema," "Liff" (sub-division of "Success").

Newcastle.—Outbreak on farm "Kuston," west of main line.

New Hanover.—Outbreaks on farms "Doornkop," "North Heath," shown on map as 51A, "Marchmont," "Cannel Hoek," "Koperbult," Lot 3 of "Doornkop," "Uitmantend."

No records of outbreaks of this disease is kept in the following districts:—The whole of the Province of Zululand, the whole of Victoria County, Vryheid, Ngotshe, Babanango, Paulpietersburg, Umsinga.

Horse shoes do not stay where they were originally placed on the horses' feet until they wear out. It is well to have the shoes examined occasionally. The cost is little and the saving great.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

DIFFERENT wicks will raise coal, oil, or water to different heights, according as they are woven, or loose like candle wicking. The close wick will raise the fluid higher in the end, but it will raise to the highest point more slowly than the loose wicking. Just so in the soils. The close ones will raise the soil water from a greater depth than will the loose, sandy ones, but the latter will bring it up quicker to the full height to which it can rise.—LUTE WILCOX (*"Irrigation Farming"*).

ESSENTIALS IN MEAT CURING.

To cure meat of any kind, it is desirable to have it from animals that, before slaughter, were in a considerable degree matured, or had attained their natural growth. After dressing, as before intimated, the first requisite is to thoroughly cool the carcass, and for this it should hang in a low temperature for thirty-six or more hours, but on no account should it freeze, especially not after being dressed; freezing its outer surface surrounds the interior of the flesh with a wall, through which the animal heat, still remaining round the bones, cannot escape, and the result will be the souring and speedy decay at the centre of hams, shoulders, etc., that outwardly appear in good condition.—F. D. COBURN (*"Swine Husbandry"*).

CO-OPERATION AND CREDIT.

The only method by which weak men can remedy their individual weakness, such as in the present case we have to postulate, is combination, the joining together of puny efforts, so as by their collective effect to produce force. Obedient to this maxim, working men combine to make their money go further in purchasing, their labour in producing. There are many more provinces of human activity into which co-operation might with advantage be introduced in the same way, such as the renting of land, the erection of houses, the use of machinery; and, please God, it some day will. The same principle is applicable also to credit. However small may be the individual's power to give security, many small units combined may very well make up a sufficiency for moderate purposes. And once this result is brought about, additional forces may, as we shall see, be brought into play, with the effect of still furthering the power produced, and making the collective security go, in the end, a very considerable way.—HENRY WOLFF (*"Co-operative Banking"*).

The great laws of nature are co-operation and harmony. The soil must have all the essential food elements, and these in harmonious proportions that the plants may grow. The four great master workmen, water, air, heat, and light, must co-operate and work in harmony that the plant may thrive. It is the mission of every tiller of the ground to give to the soil its opportunity to nourish the plant, and to give to each and all of the four workmen their opportunity to take the seed and the nourishment and from these build up the perfect plant that will ripen its grain in due season.—H. R. HILTON.

COMPOSITION OF AN EGG.

The white of the egg consists of alternative layers of denser and more fluid albumen (the composition of the white being about as follows:—Water, 84 per cent.; dry albumen, $12\frac{1}{2}$ per cent.; mineral matter, 1 per cent.; and sugar, etc., $2\frac{1}{2}$ per cent.), gradually increasing towards the yolk. In a hard-boiled egg these layers can often be peeled off singly. This albumen is highly nutritious, and as it is consumed in building up the tissues of the chick (the yolk suffering little diminution till hatching time), its absorption gives the latter the necessary additional room. Being a bad conductor of heat, it preserves the germ against sudden changes of temperature, and, by its elasticity, protects the yolk against injury from violent concussion.—J. H. SUTCLIFFE (*“Artificial Incubation and its Laws”*).

TAKING WATER SAMPLES.

In taking samples of water for purposes of analysis, a perfectly clean stoppered Winchester quart bottle (holding about half a gallon) should be used. The bottle should have previously been washed out with a little strong sulphuric (H_2SO_4) or hydrochloric (HCl) acid, and then rinsed out with frequent changes of pure water until the rinsings do not redden a piece of blue litmus paper. Before taking the sample, the bottle and the stopper should be thoroughly rinsed with the water to be analysed, and should then be filled to the neck with water, stoppered, sealed, and labelled on the spot, and, if possible, analysed within forty-eight hours. In submitting a sample of water to be analysed, as much information as possible should be given as to the situation of the source from which it has been taken, both geologically and with regard to any possible cause of pollutions in the vicinity. It is only by reading the analysis of a sample of water in close conjunction with the most careful observations of the surroundings and conditions of the source from which it has been taken, that any reliable opinion can be formed as to the suitability or otherwise of the supply for domestic purposes.—ALLAN GREENWELL, A.M.I.C.E., F.G.S., and W. T. CURRY, A.M.I.C.E., F.G.S. (*“Rural Water Supply”*).

Exchange Reviews.

WHAT OTHERS ARE THINKING AND DOING.

THE question as to whether or no grit is necessary for fowls has been argued for and against in the U.S. poultry journals to such an extent that it seems as if the question will never be settled. Mr. James Shackleton writes lucidly on the question in the *Canadian Poultry Review*, and he is of the opinion that the matter is complicated solely because some land can never become void of abundant grit on its surface, while other land has long been quite denuded of grit at or near its surface. He remarks that a fowl that has got a hard, well-developed gizzard, from having plenty of grit while growing, will withstand absence of grit for quite a while, and this clouds the issue to some people. In Mr. Shackleton's opinion the question would be settled for ever to anybody who would kill and examine any fowl just matured that had actually not been supplied, nor had found suitable grit throughout its life. "Give your fowls hard limestone grit," he advises, "or know that they find plenty, then they will have strong gizzards, and without strong, hard gizzards they can never be worth much as producers, nor remain long in prime health, but will be sickly, decrepit, subject to disease and death all the time."

Threshing with Stone Rollers.

Some interesting particulars are given in the October number of the *Indian Agriculturist* relative to the method of threshing grain by means of stone rollers practised in the East. The Presidency of Madras is chiefly referred to; and in the Presidency there are three methods of threshing grain in vogue—viz., treading by bullock power, beating with sticks, and crushing with a roller. The method of threshing by stone rollers is not suited to every sort of grain, but it is used most largely for the sorghum crop and also for grain and safflower, whilst it is believed that the method would answer satisfactorily in the case of other grain crops.

The roller used is an ordinary stone roller as used for road-making, and is generally about a yard long and one and a half to two feet in diameter. A roller of these dimensions weighs from 1,000 to 1,500 lbs. In using this roller, the preliminary operations of harvesting and drying the grain are performed as usual. If a large quantity of grain is to be treated the heads, after removal of the straw, are simply spread out in a circle over the threshing floor to the depth of about eight inches, and

the roller is driven round and round over the whole mass. More generally, however, there is a clear space left in the middle, and the bullocks are driven in a regular concentrical manner over the circular strip until the grain is as thoroughly extracted as possible. After each passage of the roller men with light wooden rakes turn over the heads so that a fresh surface is exposed each time. A little water is occasionally sprinkled on the ears if it is found that the grain is being powdered. During the process the grain gradually works to the bottom, whence it can be readily collected at the end of the operation. The extraction is not, however, complete, 10 to 20 per cent. of grain being still left on the stalks. This has to be extracted by beating with sticks, or, if the quantity is large, it is trodden out by bullocks in the ordinary way.

A New Method of Corn Culture.

The method of growing corn which has recently been advocated in Russia is described in the December number of the *Journal* of the British Board of Agriculture. The author of the system is M. Demtschinsky. M. Demtschinsky suggests the practice of earthing-up, or alternatively that of deep-setting or transplanting—the object in any case being to develop root-action and increase the tillering power, so that a greater return is obtained. In the case of earthing-up, the land would be prepared in the usual way, and the sowing done by a hand or horse drill, a little artificial manure being applied, if possible, at the same time. The drill should be arranged so as to sow three rows $3\frac{1}{2}$ to $4\frac{1}{2}$ inches apart, leaving a distance of $10\frac{1}{2}$ to 14 inches between each third row to give room for working. The greater distance is necessary when a horse hoe is to be employed.

About a month after sowing, when the young plant has appeared and begins to send out shoots, the first earthing-up should be done. This stage is a critical one in the life of the plant, and by heaping-up the earth round it the plant is protected from drought, frost, and other unfavourable influences, the tillering shoots multiply and the roots develop to a very much greater extent than they otherwise would. The process of earthing-up may be carried out with a machine like a small hand hoe or cultivator, the tines of which are arranged so as to throw the earth between the rows over the plants on each side, while the outside tines cover the outside of the rows. A week or ten days afterwards if the plants can be seen to have grown, the process can be repeated. The results of the number of experiments which have been made in Russia and elsewhere on the lines of this system are given in the article, and the method would appear to give considerably increased yields of grain.

Mineral Salts for Poultry.

Readers of the *Journal* will doubtless remember that some months ago we reproduced from the *South African Poultry Journal* an article by Mr. Devonshire suggesting that the administering of a mixture of mineral salts to poultry would help to prevent that mortality among young stock which is the chief trouble to the chicken-breeder wherever artificial methods are adopted. The suggestion was made in view of the fact that certain salts which are essential to animal life are absent from the soils of South Africa. The November number of the *Journal* of the British Board of Agriculture contains the results of tests which have been made at the College Poultry Farm, Theale, with the mixture of mineral soils in question. The formula of this mixture is as follows:—Common salt, 30 parts; phosphate of soda, 9 parts; calcium fluoride, 1 part; ferrous sulphate (green vitrol), 1 part; bone ash, 30 parts; chalk, 14 parts; Epsom salts, 10 parts; charcoal, 2 parts; flowers of sulphur, 3 parts. The following table gives the comparative weights attained at four, seven, and eleven weeks old respectively:—

Average Weights.				
		Lot I.	Lot II.	Gain of
		With salts.	Without salts.	salt fed.
At—		oz.	oz.	oz.
4 weeks	...	6.69	5.83	0.86
7 weeks	...	11.73	10.00	1.73
11 weeks	...	26.88	20.3	6.58

Dividing them according to breed, the results were as follows:—

Average Weights.					
White Wyandottes.			Buff Orpingtons.		
		With salts.	Without salts.		
At—		oz.	oz.	oz.	oz.
4 weeks	...	6.4	5.9	7.0	5.6
7 weeks	...	11.0	11.0	12.8	9.6
11 weeks	...	28.0	20.0	25.3	21.0

With the exception of the second period, when the Wyandottes were equal under both methods, the salt-fed birds showed a considerable gain over the others.

Fibre Machinery.

In an article on sisal planting in German East Africa, in the quarterly *Agricultural Journal of British East Africa*, Mr. A. E. F. Fawcus states that the three decorticating machines chiefly used in German East Africa are the Mola, the Finnigan-Zabriski and the Neue Corona. The main principle of all these machines is the same; there are two scutching wheels revolving opposite ways, and the leaves being fed

into the machine are mechanically held whilst the first scutching wheel cleans half the leaf; they are then automatically passed on to the second wheel, which scutches the other half of the leaf. The Neue Corona is undoubtedly the most popular decorticator in use in German East Africa at the present day. It will turn out $2\frac{1}{2}$ tons of clean fibre daily, as against $\frac{3}{4}$ ton by the Finnigan-Zabriski and 2 tons by the Mola. The wear and tear on the latter of these is very great and the fibre is often very much damaged whilst being cleaned by this machine. The main objection to the Finnigan is the small amount of fibre it is capable of turning out per day.

On all these machines trouble is caused by the chemical action of the chlorophyll on the iron and steel. There is also a machine called the Raspador; this consists of one scutching wheel only and is hand fed. It is very simple, but the loss of hands and arms from being dragged into the machine is very great. Ten of these machines will decorticate about one ton per day, but the amount of labour required for these machines is too great to be economical.

Soil Cultivation.

Discussing the subject of soil cultivation and the reasons why good cultivation is necessary for the production of the large crops, the *Agricultural Gazette* of Tasmania gives some interesting information with regard to the agencies of the soil materially contributing towards successful cropping. In ploughing land, the intention is to break the soil particles, so that the seed can be, when sown, lightly yet firmly covered by the soil. At the same time this operation, when conducted prior to sowing, exerts a considerable influence on the preparation of plant food, which is really a process of slow digestion brought about by the means of moisture, atmospheric agencies, and germ life. The solid particles of soil do not enter the tiny rootlets or feeding-channels of the plant, but contain substances which, when brought into solution, are attracted to the plant root and assimilated. The oxygen in the atmosphere unites with insoluble material required by the plant, and rain falling, particularly when charged with carbonic acid, renders soluble this otherwise useless material. The atmosphere contains a small quantity of carbonic acid, which is dissolved and brought to the soil in wet weather, but the decaying vegetable matter is the principal source of this useful article in the soil. This carbonic acid unites with soil bases, such as lime, potash, etc., and forms carbonates, substances readily assimilated by the root fibres. The atmospheric influences are mainly those produced by changes of temperature, disintegrating action of a winter frost being one of the best channels through which a good seed bed can be obtained.

The constituent parts of the soil can be separated into three, *viz.*, sand, clay, and vegetable matter. The proper control of the proportion of sand decides the ease with which a soil can be worked, but if present to excess the soil may be blown away by the wind. Besides bearing upon the tillable qualities of a soil, sand promotes the distribution of the rainfall, and the warmth derived from the sun. Sand in itself contains little or nothing as regards food for the growing plant, but is useful as a corrective when associated with clay. A soil consisting of a marked predominance of clay would be almost unworkable. It is to the elements of which clay is composed that we owe the alkalies, which are indispensable for crop-production, so that the importance of this constituent must not be overlooked. The vegetable matter or humus is responsible for the important element, nitrogen, and it is of great value in the direction of controlling the moisture supply of soils. Besides the above, the tilthy properties of a soil in which either clay or sand occur to an injurious excess can be profoundly modified by the judicious employment of vegetable matter.

Breeding for Egg Production.

That like will produce like is a very old saying. It is a saying worthy of consideration in poultry business. Hens that are heavy egg producers are more than likely to produce their own kind, while hens that are poor egg producers are doubly certain to produce those less prolific than themselves: this at any rate is the opinion of *The Feather* (U.S.A.). Our contemporary points out that much more attention is given to selecting the stock from which fine milch cows are grown than we recommend for producing a laying strain of poultry. "When the time comes to hatch the chicks in the spring, many of us are much too anxious to place the first eggs we can lay our hands on under the hen to be hatched or into the incubator, as may be, but if we should select in advance these heavy egg-producing pullets of the year before and keep them for the express purpose of laying the eggs from which to hatch our laying pullets for the next winter we would be surprised at the startling increase of egg yield that we would have as a result of such selection."

Pullets hatched from eggs that come from hens that only produce thirty-five or forty eggs a year do not, we are told, inherit the laying instinct; rather would they inherit the propensity of the mother hens not to lay many eggs. While, on the other hand, eggs from the continuous and large egg-producers would be pullets that would inherit the laying propensity, and they would naturally become large egg-producers themselves. Another feature of vital importance is the selection of male birds from the hens that have been fine egg-producers in line for several generations. "If the proper amount of attention is given to both of these necessary requirements, people will find that the increased egg-production in their flocks will be so marked as to be beyond all expectations."

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

THE annual general meeting of the Krantzkop Farmers' Association was held on the 22nd January. Mr. M. Landsberg (the President) occupied the chair, and there was a fairly good attendance of members.

PRESIDENT'S ADDRESS.

The President (Mr. M. Landsberg) read the following report:—

"Gentlemen,—I have much pleasure in presenting to you my third annual report.

"The Association has now been in force for three years. Our membership is good, though it has fallen off slightly.

"One special general meeting was held during the past year, also two committee meetings, as well as two public meetings under the auspices of the Farmers' Association, chiefly in connection with the railway line.

"To review the work done by the Association will not take up many minutes. Though this Association has been in a more or less moribund condition, it is very gratifying to be able to report that the work of the members on their farms has been carried on with so much energy and ability that the crops produced this season have eclipsed all previous records, and fairly remunerative prices have ruled our staple products, mealies and wattle bark.

THE NATAL AGRICULTURAL UNION.

"Your Association was represented at the Conference by Mr. G. T. van Rooyen and myself. Everything that took place was well reported in the Natal press, and it would be needless for me to review same. The resolutions sent down by you were passed.

"I would like to draw your attention to the necessity of supporting this Union. It is a very strong body, and has great weight with all the South African Governments. This Union is represented by all farmers' associations and agricultural societies in Natal.

EAST COAST FEVER.

"I almost felt inclined to leave this paragraph out of my report in view of the position we are in to-day. There are only a few clean farms now in the district, namely, on the northern side. We all feel the hardship of having no cattle very severely—as there also seems to be no hope whatever that the Colony will ever get rid of the disease. Many members have purchased mules and donkeys, the former being recognised as a very good substitute of our former draught animals.

"Many of our farmers, including myself, tried all the reputed cures,

and rather than do good they became very disastrous, as many farmers had good opportunities to dispose of their cattle. There are a good many salted cattle and also others which were naturally immuned. Of course, these have become more precious, and I am sure they may still survive and may eventually help to build up great troops again.

MEALIES.

"The general outlook for the future for mealies seems very prosperous. Our mealies on the Continent are now getting top prices against the world. The export trade has not been much good to us in view of the heavy transport rates, but in any case we could not have exported much, and this year every one predicts that we will just have about enough mealies for the locations, where this year I believe the crops have failed, and those of you who kept last year's mealies may get very good prices in another month or two.

"I am not quite satisfied with the production of mealies in our district. We are growing more than formerly, but there is room for much more, and, since we have no more cattle to look after, I trust that every farmer will work hard so that when we do get the railway line that Krantzkop will stand out as a mealie-growing district. So far the mealie crop for this year looks very well, though it is rather premature to express an opinion in view of the excessive rains we are getting, but we may still have a record crop in spite of East Coast Fever.

FERTILISERS.

"I am glad to say that a large quantity of bone dust was ordered through our Association from abroad, and from various opinions from the leading farmers it is said that it is the best ever yet used. A few members did not like to take the risk, but fortunately it happened to be a huge success both for quality and price. I hope the experiment will be an inducement to all the farmers to co-operate and get their bone dust in a similar manner as it has long been recognised that Colonial bone dust is too expensive and too coarse, though at the same time we are all anxious to support Colonial industries. An opportunity will be given you all to express an opinion and decide on next season's fertilisers, and whatever you decide upon I am sure can be carried through effectively. I am sorry none of our members tried the Weenen phosphates, as in other parts of the Colony they seem to be doing good.

"Before closing this section I am sure you are all aware of the good work done by our Secretary in connection with the consignment of bone dust. It cost him great personal inconvenience and also several journeys to Greytown to arrange for the off-loading, transport, storage, etc. He is alone responsible for the good way and business-like conditions under which the bone dust reached its destination without any complaints and loss, and I am sure we are all grateful to him.

THE WATTLE INDUSTRY.

"During the past year we realised very good prices for our bark, and I think a record number of tons was exported from Krantzkop. A firm opened business here to cut wattle bark. They gave all transport facilities, which we would not have obtained otherwise, and it came as a boom to the many who have not got their own transport. There is about 6,000 acres now under wattle cultivation and many are still cultivating, and I hope every one of you will not linger until the railway line comes. We produce very good bark and our plantations do very well, and the more wattles we can show the better will our prospects become of getting the line.

SHEEP.

"I have not, as I expected during the year, noticed that sheep-farming is taken up more freely. Blue-tongue vaccine was tried by one of our farmers, and we are all looking forward to his experiment, which will be a great boon if successful as the same farmer lost heavily last year. Our farms are really too small in this district for sheep, but I think by planting the different grasses which are successful in other districts we may still hope to increase our flocks successfully.

THE LABOUR QUESTION.

"Native labour became very scarce at one time, and was impossible to get without making advances. This form of obtaining labour I think is a very bad policy, and all of you who have experienced it knows that the native is very unsatisfactory if he works for money which he has already spent. The sooner we resolve to stop it the better, though it may be a little more expensive. If we joined together and worked unanimously I am sure we will get the native under our control and get better satisfaction. Our natives in this district are very unsatisfactory chiefly on account of money lending at high rates of interest, which I am glad to say has been stopped.

KRANTZKOP RAILWAY.

"During the past year we held two big meetings to agitate and lay our claim for a line before Government. These meetings were well attended, and two deputations went down to interview the Government, and we have partly succeeded in our efforts as I have reason to believe that a line will be built shortly, and if we continue to agitate similarly I am sure we will be bound to succeed. A Bill to authorise the construction of the line has been passed by Parliament, and it is reported that the Government are going to leave it to the Union Parliament. This, I think, is very unfair, and I think it is time to worry the Government again. The Greytown Local Board are anxious that we should send down another deputation, together with two members appointed by them. I lay their suggestions before you, and I trust they will receive your earnest consideration.

ROADS.

"Our roads at the present time are in a disgraceful state, it being almost impossible to travel along with any vehicle. The Government are repairing it now, and I think we should insist that unless the Government is going to give us a railway line that they must make the road in such a way that it could be used all through the year and not only in dry seasons.

CONCLUSION.

"I must conclude by tendering my thanks to all office-bearers, committee and members for their willing support and kindly help in the work of our Association, and in particular to our Honorary Secretary and Treasurer, Mr. G. T. van Rooyen, who has proved himself an enthusiastic and competent worker.

"Gentlemen, in electing me for three years in succession as your President, you have honoured me, and I trust that my efforts in endeavouring to promote the welfare of our Association have given satisfaction."

The Secretary (Mr. G. T. van Rooyen) presented the statement of income and expenditure, which showed a credit balance of £14 13s. 8d.

Dr. Proksch, in a few well chosen remarks, proposed a hearty vote of thanks to the retiring officials, which was carried unanimously.

The following office-bearers were then elected for the ensuing year:-- President, Mr. M. Landsberg (re-elected); Vice-President, Mr. U. R. Vermaak (re-elected); Secretary and Treasurer, Mr. G. T. van Rooyen (re-elected); Committee, Messrs. C. J. van Rooyen, Albany; L. M. J. van Rooyen, P. R. Martens, C. J. van Rooyen, L.'s son, J. A. G. Mare, F. E. van Rooyen, and Dr. Proksch; Auditor, Mr. P. Reid.

The Secretary was voted a sum of £4 4s. for his services.

As soon as the election of office-bearers was finished, members at once started on the railway line question.

The Secretary read a letter from the Town Clerk, Greytown, requesting the meeting to send two delegates with two appointed from Greytown to interview the Minister of Railways. The meeting at once fell in with the idea, and Dr. Proksch and Mr. G. T. van Rooyen were elected as such delegates.

AGRICULTURAL HALL.

It was decided to start a fund to build an agricultural hall. A subscription list was started immediately, and as soon as £200 was raised a meeting would be called later to form a building committee.

Poultry-houses, pig-styes, and all cow or stock sheds can easily and cheaply be made entirely warm and comfortable for winter by the simple use of forest leaves.

Correspondence.

** * Correspondence is invited on topics of interest to farmers. Letters should be written on one side of the paper only; and while a nom-de-plume may be used, all letters must be accompanied by the name and address of writer. The Editor is not responsible for the opinions of his correspondents: the letters which appear in these pages are published as the opinions of the respective writers, and their insertion does not necessarily imply editorial concurrence with the views expressed.*

THE LABORATORY DIP.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I observe a letter in your issue of January, written by "M. C.," asking if it is possible to make the Laboratory Dip in a concentrated form, and I observe also your reply, that the Bacteriological Department has only devised the ingredients, etc., but has not gone into the matter of preparation of this dip in a concentrated form.

I may say for the last two or three months I have had this dip specially prepared, and it is sold in five gallon drums. I am not aware that any other proprietor or manufacturer has this dip on the South African market excepting myself, and if this information is of service to your correspondent or any others who have a preference for the Laboratory Dip, I shall be only too pleased to supply them.—Yours faithfully,

Durban.

CLAS. W. HOLMES.

VASOTOMY *versus* CASTRATION.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Since communicating with you on the above subject, I have thought of an easier plan to effect the result required.

OPERATION.

1. Expose the glands by an incision in the scrotum at most dependent part.

2. Protrude the lower pole of each gland and snick off a portion or all of the globus minor with a punch forceps.

In this way the nerves and blood vessels to the gland are not interfered with and any accumulation of fluid drains through the dependent incision. The seminal function of the testicle rapidly disappears while the nutritional is retained. More wool, more flesh, generally a stronger animal results.—I am, etc.,

Durban, 15th February, 1910.

WM. ROBERTSON, M.D.

A USEFUL BOOKLET.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I shall be pleased if you will accept the enclosed pocket-book of maize tables recently prepared by me. These tables I have had to prepare for my own use, and probably others in the trade will find them time-saving.

This book should be equally useful to maize-growers and maize-dealers in the country. It enables the farmer or storekeeper to see at a glance the equivalent price per muid free on board of a given c.i.f. price per 480 lbs. at a given rate of freight. Now that London prices are regularly cabled to the Press in South Africa, the farmer and dealer will probably welcome a ready method of ascertaining the equivalent price f.o.b. at the port without having to waste his own time in long and frequent calculations.

The periods at which other maize-growing countries make their shipments will give our country friends an idea as to the time when London is likely to be most plentifully supplied with maize, and this information may help them gauge more effectively the market tendency.—Yours, etc.,

H. A. BARNBY.

40, Club Arcade, Durban.

[The booklet should prove useful to all interested in the production and handling of maize. We understand that copies are obtainable from Messrs. P. Davis & Sons, Maritzburg and Durban.]

THE CREAMERY INDUSTRY.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—During the past four months, having studied the conditions of dairying in South Africa generally, arising from the development of the industry over the comparatively short space of the past two years, and in the light of past experience—extending through many years and spent in the dairying countries of Europe—I have come to the conclusion that the immediate organisation of the industry on principles known to be successful in other countries in their application to the science of dairying is imperative on our part. I mean in this respect, that such principles should be stamped to meet the necessities of our South African conditions, and which I may claim to have some knowledge of, gained within the past five years in my attempt to establish the largest system of creameries so far thought of in the Cape Colony.

The basis of dairying, to be successful, must rest on, according to my experience:—

- (a) *Technical education* in the science of dairying.
- (b) *Organisation* for production and distribution.

These headings contain the essentials of success, and it is for us engaged in the industry to judge how far our position in respect of both

may be said to meet our conditions, and with a view to formulating a programme on a broad or national basis which may meet with the sympathy of creamery owners, managers, and the future United Government of South Africa.

I suggest, after consultation with various creamery workers and interests, that a Conference be held at an early date and at a convenient centre (may I suggest Bloemfontein?) which may deal with the situation as it is to-day, I briefly touch on the latter point, with a view to suggesting the subjects for such a Conference as I propose.

Creameries are springing up all over the country, nominally without control or guidance from any common centre; as institutions, competition between them is commencing both in respect of production and distribution—the latter particularly in a ruinous fashion.

There seems to be no *standardised system* in respect of building and equipment, which is a great disadvantage and source of loss, as another year or two will show.

The Management within the creameries may be sound or otherwise, and, to my mind, is a matter of mere chance since the country affords managers little opportunity of education. Here, just think of the huge sums spent by our competitors, such as Canada, Australia, Ireland, Denmark, etc. on the science of dairying. Managers, as such, are without any organisation which should mainly exist for their education as a body, while protecting their interests as a whole. When all is said and done, the great future of the industry depends on the managers of our creameries in the main.

Markets: To-day the conditions are nearly chaotic, and in another year, with developments now pending, local or home summer supplies will have reached such proportions that, unless a central system of control is established, prices ruling will mean the destruction of our work almost before its birth. It lies with ourselves to avert any such calamity.

Education of Suppliers, in respect of production, the proper care and treatment of milk and cream, and, equally essential, the development and treatment of dairy cattle. To-day we have in South Africa numbers of cows—sufficient to yield millions of pounds' worth of dairy produce annually. Why is this not the case? I think essentially the want of education and management.

Without giving further reasons, the necessity will be clear for the Conference I propose, and, in the absence of any organisation, I willingly offer my services as secretary *pro tem* to carry out any action this letter may promote.

The importance of the industry, as I feel it, is my excuse for sending a copy of this letter to every creamery in South Africa, as well as to Ministers of our respective Governments, presidents of agricultural societies etc.—Yours, etc.,

R. J. MOORE,

East London. *Creameries Expert, Eastern District Creameries, C.C.*

THE FARMER BOYS' PAGES.

MONTHLY ARTICLES, NOTES AND PARAGRAPHS ON
ELEMENTARY AGRICULTURAL SUBJECTS

FOR

BEGINNERS IN AGRICULTURE AND STUDENTS GENERALLY.

Conducted by "ARATOR."

* * *Correspondence, whether in the form of notes, comments, or inquiries, is invited from readers, and letters of general interest will be published and replied to in these pages. All communications should be addressed to "ARATOR," C.O. Editor, "Natal Agricultural Journal," Maritzburg.*

A Chat about the Soil.

VI.—THE PHYSICS OF THE SOIL.—(Concluded).

CONTINUING our discussion of the part played by moisture in the soil, we come now to consider the question of capillarity.

Capillarity is the exact opposite of percolation. The coarser a soil is the more readily will water percolate through it, and the less readily will moisture rise by capillarity, whilst, on the other hand, the finer the particles in the soil, the less readily will water sink through that soil, and the greater will be the capillary movement. Capillarity, in other words, may for practical purposes be described as that power which causes moisture to rise in soils against the attraction of gravity.

A fairly good idea of the manner in which capillary movement of moisture takes place in soils may be obtained by taking a number of glass tubes and filling them with different kinds of soil and placing the lower ends in water. A shallow tray should be filled with water and the tubes stood in it. After a little time has elapsed it will be noticed that the water has risen in the soil in the tubes, but it will also be noticed that in the tubes which contain the finest soils—that is soils whose particles are in the finest state and sub-division, such as clay—the water has risen to a greater height than in the tubes containing soil of a more

sandy nature. If the tubes have been arranged according to the degree of fineness of the particles of the soil contained in them, it will be found that the height of the water in them will vary in a steadily descending line from the tube of clay soil at the one end of the series down to the tube of soil that is practically sand at the other end. The difference between the two extremes will be best illustrated if we say that for twenty-two parts, points or degrees which the water may have risen in a tube of coarse sand it will rise to a height of fifty points in a tube of clay. We now see why it is that a clay soil is more inclined to be a wet one than a sandy soil; in a clay soil it is only with difficulty that water soaks down through it and drains off, whilst it soaks upwards by capillarity more readily than soils whose particles are coarse.

EVAPORATION.

Coming now to evaporation, we find that this process takes place at all times when rain is not falling or water is being applied by irrigation. The water from below is gradually brought to the surface of the soil by capillary action, and there it goes off into vapour in the air, and the hotter the air the more rapid will be such evaporation.

Evaporation is up to a certain point beneficial, since, by providing an outlet for the moisture near the surface of the soil, it enables the movement of moisture from below upwards by capillary action to take place, and this movement of soil moisture brings into contact with the roots of plants the salts in solution which are essential to their existence. These salts are indeed brought to the surface of the soil, and if that upward movement takes place too rapidly we have as a result a layer of white salt on the surface, but in this country, and in most countries, this is prevented by the downward soaking of rain water.

Evaporation is in most countries carried on to too great an extent, and the result is that crops often suffer for lack of sufficient moisture. It must be realised that the salts which serve as food for plants must be dissolved before they can be absorbed by the roots of a plant, and if sufficient moisture for that purpose is not forthcoming, plants must necessarily starve to a corresponding extent. Excessive evaporation can be prevented by keeping the surface of the soil in what is termed a "mulched state"—that is to say by forming a layer of dust on its surface. This layer breaks up the capillary attraction which causes the water from below to rise to the surface of the soil, and the evaporation of that moisture is thus prevented. Care must be taken, however, to have this mulch in a fine state, for if the ground is merely broken and left in clods evaporation will proceed at an even faster rate than if no attempt at conservation had been made.

TEMPERATURE.

Temperature is the next subject to which we have to make reference,

but a few lines will be sufficient for our purpose. The temperature of a soil has an influence upon plant life, and anything above or below the range of temperature in which the plants thrive best has a tendency to check their growth. From 60 deg. to 90 deg. Fah. is the range in which the general run of our farm crops thrive best.

Temperature is dependant upon a number of factors, such as colour, the presence of stones, the absorptive power of the soil in reference to moisture, the aspect of the field, manuring with bone manure, a covering of grass, etc., and even the ordinary operation of cultivation, rolling, etc.

TILTH.

We pass now to the subject of tilth, which will complete our study of the Physics of the Soil. Tilth has been defined as "the condition of looseness and friability among the particles of soil necessary for the healthy growth of the crops." All our farm crops have been improved by artificial selection, and as soon as such improvement is begun the condition of the soil in which they are to be grown must be improved. In general it may be stated that the more we brake up the lumps in the soil and the more we reduce the soil to a state of fineness the better will be the resulting crop. In fact, tillage carefully performed reduces the amount of fertiliser required. The reason of this is that before the substances which go to form plant food can be made use of by plants, they must be oxidised by being brought in contact with the air, which is the reason why portions of the subsoil brought to the surface by too deep ploughing will not improve the soil—and in fact may even prove harmful to crops grown on that soil—until they have been in contact with the atmosphere for some time. By turning over the soil and reducing it to as fine a state of sub-division as possible, more plant food will become available, and a crop grown thereon will give better returns than if less attention had been paid to tillage. It is not to be understood, however, that we mean that portions of the subsoil should be brought up (although a soil can be deepened by so doing); what we mean is that the plant food substances already existing in the soil proper but in a condition in which they cannot be made use of by plants, will by being brought into better contact with the atmosphere by tillage become more and more available for use by the roots of growing crops. This matter of the advantage of tillage is one which should be borne in mind by every farmer who wishes to reduce his annual expenditure on fertilising materials, or who, at the same expenditure, wishes to secure larger crops. Every subsequent ploughing after the first before the seed is sown increases the amount of plant food available for use by crops, and after the plants have come up cultivation between the rows will stir the soil, admit more air, and so still further increase the prospects of a good crop.

Agricultural Chemistry for Beginners.

CHAPTER VI.

By ARCHIBALD PEARCE.

THE PHOSPHATES.

SUPERPHOSPHATES.

ALTHOUGH it was shown that by means of acids the insoluble phosphates can be brought into solution, this is not an example of the simple kind of solution that takes place when sugar dissolves in tea, for instance, or salt in water, where no chemical change occurs; in reality the acid seizes on some of the calcium, and the phosphate becomes converted into the mono-calcic variety. This is the principle upon which the so-called superphosphate is made. The tri-calcic phosphate, usually in the form of mineral phosphate but sometimes as bones, animal charcoal (which is only charred bone), or guano, is ground to a fine flour, and treated with the proper proportions of sulphuric acid: the hydrogen of the acid and two portions of the calcium of the phosphate change places, and the result is mono-calcic phosphate and calcium sulphate (sulphate of lime); and when properly dried we have the well-known superphosphate of commerce. When made from bones, it is called dissolved bones; and when partly of bones and partly of mineral phosphate, dissolved bone compound; but even dissolved bones are generally made with a small proportion of mineral phosphate, as pure bone superphosphate is apt to be pasty and difficult to dry, or the difficulty is avoided by only converting a portion of the bone into superphosphate. Most of the mixed or "special" manures have superphosphate as their groundwork or basis, other ingredients being added to suit the special needs of the crop for which they are manufactured. The great value of this product lies in its solubility, which makes it the quickest acting of all phosphatic manures; the rain carries it about in the soil, and so wherever the roots penetrate they find their food ready for them. It is especially suited for soils rich in lime, and on such it is probably the best phosphatic fertiliser.

DI-CALCIC PHOSPHATE.

If superphosphate is brought into contact with lime it is converted into the di-calcic form, which pure water will not dissolve. It is, however, readily soluble in very weak acids, and in consequence is probably just as easily taken up by plants as the soluble form; but it has to a great extent lost its power of diffusing through the soil. Also when superphosphate is kept in stock for some time, the amount of mono-calcic

phosphate contained in it is found to gradually diminish, a certain proportion of di-calcic phosphate being formed in its place. This latter is, therefore, often called reduced or reverted phosphate, and the manure is said to go back. Practically there is little if any loss of value through this action; in fact, farmers sometimes produce the reduction artificially. The reduced phosphate is much less liable to be washed away from light soils than the more soluble superphosphate, and so it is easy to see that in some cases it is preferable. A useful method of reducing superphosphate is to mix it with about one-third its weight of bone dust, and moisten the mass slightly, turning it over occasionally for five or six weeks. In this way some of the bone phosphate reacts on the superphosphate, and both are converted into the reduced state. Such a mixture is often better than either of its ingredients on soils with little lime in them. Instead of bone dust we may use the same weight of basic slag; a thorough mixing must be given, and the manure can be used at once. When an analyst, in reporting on a manure, speaks of citrate-soluble phosphate, he is referring to the di-calcic variety, a weak solution of citric acid being the nearest way yet devised of imitating the solvent powers of root-juices, and so distinguishing this phosphate from the other two.

BASIC SLAG.

An irregular form of calcium phosphate occurs in basic slag or Thomas' phosphate, which is not constructed in either of the forms already mentioned, and is perhaps not found in any other substance. Up to the present it has hardly been thoroughly investigated, but appears to be partially soluble in citric acid, and upon the amount so soluble the value of a sample largely depends. It is usual to give only the total amount of phosphoric oxide present in an analysis of this manure, but it would be better if the citrate-soluble portion were also estimated. Basic slag is a by-product in the Thomas-Gilchrist process of steel-making, and is not a single chemical compound, but a mixture of several; accordingly, the percentage of phosphoric oxide is not strictly defined, but varies in different samples from 15 to 20 per cent. It needs to be very finely ground to be of any use.

PHOSPHATIC MANURING.

Several phosphatic manures have been mentioned in this and the preceding chapter; it only remains to say that as a general rule phosphoric acid in one form or another is the one ingredient of fertilisers that cannot be omitted, and in some cases is the only one required. Turnips especially demand that they shall have a full supply from the commencement of their life. On soils, with a fair amount of lime in their composition, there is probably nothing better or cheaper than superphosphate, or the mixtures made from it. If the soil is poor in lime it is generally better to use non-acid manures, such as bones, basic slag, or guano; it

must not be forgotten, however, that a somewhat heavier dressing of these is needed, because being less soluble the roots must have a larger quantity to act on. But the excess remains in the soil for the benefit of the next crop. If the soil has a tendency to sourness, *i.e.*, acidity, basic slag should be tried, as it contains some free lime, which helps to neutralise the vegetable acids which are detrimental to plant growth.

PHOSPHATES IN ANALYSIS

A little explanation is necessary as to the manner in which the percentage of phosphates is given in analyses of soils and manures, as there is unfortunately a good deal of confusion, or at any rate a want of agreement, which is likely to lead to confusion. We shall probably find, if we consult an analysis, that so many per cent. of phosphoric acid and lime are given. For analytical purposes it is much the most convenient plan to consider a salt as made up of an acid-forming oxide and a basic oxide, and we have seen that salts can be formed in this way, though it is not the most scientific way to look at it. Moreover, it has been the custom, handed down from the darker ages of science, to speak of this acid oxide as the acid itself, which is certainly incorrect. Therefore, when we see phosphoric acid in an analysis, we must understand that phosphoric oxide is meant; and in some places, the Cape, for example, the correct term has been brought into use. Another plan formerly common, and still adhered to by manure manufacturers, is to reduce all phosphates to the equivalent quantity of tri-calcic phosphate. If, for instance, a superphosphate is said to contain 30 per cent. of soluble phosphate, this does not mean that there is 30 per cent. of mono-calcic phosphate, but that if the mono-calcic phosphate were converted into tri-calcic phosphate, there would be 30 per cent. of the latter. No doubt the larger figures look better; but the method appears to be one of those "trade customs" which are not always understood by the ordinary purchaser. If the average farmer has the choice of two manures, one stated to contain 36 per cent. of soluble phosphate and the other 20 per cent. of soluble phosphoric acid (or oxide), the odds are he would choose the former; yet a little calculation with the figures given below will show that 36 per cent. of tri-calcic phosphate is only equal to about 16½ per cent. of phosphoric oxide.

The factors necessary for the comparison of phosphoric oxide with the phosphates are as follows:—

One part of phosphoric oxide equals 1.648 parts of mono-calcic phosphate.

One part of phosphoric oxide equals 1.915 parts of di-calcic phosphate.

One part of phosphoric oxide equals 2.183 parts of tri-calcic phosphate.

One part of mono-calcic phosphate equals .607 parts of phosphoric oxide.

One part of di-calcic phosphate equals .522 parts of phosphoric oxide.

One part of tri-calcic phosphate equals .458 parts of phosphoric oxide.

QUESTIONS.

1. Explain what superphosphate is, and how it is made.
2. What sort of soils is superphosphate best suited for, and why does it act so quickly?
3. What is the action of lime on superphosphate?
4. What is the object of mixing superphosphate with bone dust?
5. Mention a crop from which superphosphates are a prime necessity.
6. If a sample of bone dust contains 20 per cent. of phosphoric oxide, how much tri-calcic phosphate will it have?
7. What is basic slag? Why is it so good for sour soils?
8. Explain exactly what is meant by soluble phosphate in an analysis. If a special manure is said to contain 25 per cent. of soluble phosphate and 5 per cent. insoluble phosphate, calculate the amount of phosphoric oxide in each. (Answer: 11.45 per cent. soluble, and 2.29 per cent. insoluble phosphoric oxide.)

Tests for Students.

SOME USEFUL QUESTIONS AND ANSWERS.

THE following is a continuation of the questions and answers published last month:—

KINDS OF SOIL.

Question 1: What are the five different kinds of soil that we usually find on farms?

Answer: (a) Sandy soils, (b) clay soils, (c) sandy loams, (d) clay loams, (e) humus soils.

Question 2: What is a sandy soil?

Answer: A sandy soil is one that contains a large amount of sand.

Question 3: What is a clay soil?

Answer: A clay soil is one that contains a large amount of clay. A clay soil may be recognised by its sticky character.

Question 4: What is a loam?

Answer: A loam is a soil that is a mixture of sand and clay.

Question 5: What is a sandy loam?

Answer: A sandy loam is a soil made up principally of sand and clay, but containing considerably more sand than clay.

Question 6: What is a clay loam?

Answer: A clay is a soil made up principally of sand and clay, but containing more clay than sand.

Question 7: What is humus soil?

Answer: A humus soil is one that contains a large amount of decaying organic matter.

Question 8: What do we mean by "light" and "heavy" soils?

Answer: When we speak of *light* and *heavy* soils we do not refer to the actual weight of the soils, but to the way they behave when cultivated.

Question 9: What is a light soil?

Answer: A light soil is one that is porous so that a plough or other implement can easily run through it. A light soil is easy to cultivate as it usually contains much sand.

Question 10: What is a heavy soil?

Answer: A heavy soil is one that is stiff and difficult to cultivate. Heavy soils contain much clay.

Question 11: What do we mean by "warm" and "cold" soils?

Answer: Soils are called *warm* and *cold* according to their power to return the sun's heat.

Question 12: Why is the amount of heat in soils a matter of importance?

Answer: All plants for their proper development require a certain amount of heat. Seeds will not sprout until the soil has become warmed to the required temperature, and most farm crops attain their most perfect development only in warm soils.

Question 13: What conditions influence soil temperature?

Answer: (a) Water, (b) colour of soil, (c) composition of soil, (d) fineness of soil.

Question 14: How does water affect the temperature of soils?

Answer: In very wet soils moisture is continually evaporating, and consequently such soils are usually cold. In dry soils there is but little evaporation, and the soil through the sun's heat becomes warm. As a rule the drier the soil the greater the amount of heat absorbed.

Question 15: How does colour affect the temperature of soils?

Answer: It is a well known fact that colour influences temperature, so with soils a dark soil is warmer than a light one.

Question 16: How does composition affect the temperature of soils?

Answer: As a rule sandy soils are warmer than clay soils.

Question 17: How does the fineness of the particles affect the temperature of soils?

Answer: Coarse, rocky soils suffer from extremes of temperature. In fine, well-cultivated soils the temperature is almost uniform.

Turkey Notes.

THE growing of turkeys is not commanding the attention it deserves.

Do not forget to plant enough onions so the turkeys can have the tops and both layers and fattening fowls have the bulbs.

The surest and quickest way to get a flock of good turkeys is to discard all the mongrels and purchase a trio of pure-bred turkeys of the best blood you can afford.

The critical period in the young turkey's life is generally at an end when six weeks of age. In-breeding lice, dampness, and improper food are the main causes of great mortality.

Turkey hens are profitable until five years of age, but it is a good plan to change the gobblers every year. It requires twenty-eight days to hatch a turkey egg, and seven eggs is considered a setting. The nests should be on the ground.

Essentials Necessary in Producing Good Eggs.

HENS that produce 180 to 200 eggs yearly.

Hens that produce eggs of 2 oz. weight on the average. The breeds already mentioned may be expected to do this.

Good housing, regular feeding and watering, and clean, dry nests.

Gathering eggs daily. When the temperature is above 80 deg. gather twice daily.

Confining broody hens as soon as discovered.

The rejection, as doubtful, of all eggs found in a nest not visited the previous day. Such should be used in the home.

The placing of summer eggs, as soon as collected, in the coolest place.

The prevention, at all times, of moisture in any form coming in contact with the egg.

The disposal of the cockerels before they get among the hens. Also the selling of old male birds, or confining same from the time hatching is over until required again.

The using of cracked and dirty eggs in the home.

The marketing of all eggs at least once each week, oftener if possible.

Keeping eggs as dry and cool as possible when *en route* to market, or when stored.

Keeping eggs away from bad odours or musty cellars.—H. V. HOWKINS, in *Agricultural Gazette*

Dairy Notes.

KEEP up the milk by good feeding.

Six weeks before calving is early enough to dry up the cow.

The cow's ration should be governed according to her ability to turn it into profit.

Dairy products enter into continuous and universal consumption, and will always be manufactured and sold.

It always pays to feed a cow all she can convert into milk without waste and injury to herself.

The purpose of the dairy cow is to give milk, and not many beefy animals are adapted to this purpose.

The largest steady flow of milk which can be obtained by reasonable outlay of feed is always the most profitable.

Separate the milk as soon as possible after milking, and then clean the separator thoroughly with hot water and soda.

Sour cream makes tough butter and lacking in that delicate aroma that attaches to butter made from cream that is ripe but not sour.

Compelling the cow to drink icily cold water is increasing the cost of making butter, as more feed is required to maintain animal heat.

The code of rules for the government of elementary schools, which has recently (September 3rd, 1909), been issued in St. Lucia, shows that *Blackie's Tropical Reader*, Parts I. and II., and *Nature Teaching* are chiefly used as aids in teaching science in those schools. Assistance is also afforded, at most of the schools, through the possession of school gardens. Instruction is also given in the rules of tropical hygiene.—*Agricultural News* (West Indies).

Turkey eggs require twenty-eight days for incubation. Coincide with the hen turkey's desire for secrecy, and let her sit in places hidden from the sight of men and dogs. Bottomless boxes that will shed rain, old barrels with two or three staves knocked out, "A" coops, measuring not less than three feet square at the base, placed in retired situations not far from the house, are all that are necessary for hatching purposes. If the turkeys are taught to lay in them, all the better. The nest should be upon the ground and made of forest leaves or chopped hay. If turkeys are set in barrels laid on their side, holes should be bored in the under side of the barrel to let out rain water, or it may hold water enough to spoil the eggs.—HERBERT MYRICK (*"Turkeys and How to Grow Them"*).

Meteorological Returns.

Meteorological Observations taken at the Govt. Stations for the Month of January, 1910.

STATIONS	TEMPERATURE (Fahr. Deg.)				RAINFALL (In Inches)						
	Means for Month		Maximum for Month	Minimum for Month	Total for Month	No. of Days	Heaviest rainfall in 1 day.		Total for Year from July 1 1909	Total for same period from July 1 1908	
	Maximum	Minimum					Fall	Day			
Observatory ..	81.6	67.2	88.4	63.2	3.99	16	.86	15th	26.49	24.23	
Stanger ..	84.9	65.3	99	60	5.71	14	1.31	12th	33.21	26.28	
Verulam ..	86.7	66.0	95	62	4.08	14	.83	20th	22.27	25.14	
Greytown ..	81.4	53.7	90	47	7.78	17	1.25	13th	24.60	30.36	
Newcastle ..	85.9	53.9	99	42	6.43	13	2.02	20th	21.65	—	
Umbogintwini ..	82.0	61.9	92	60	4.21	14	.99	11th	28.63	—	
Estcourt ..	82.3	48.9	94	33	5.73	18	1.14	11th	19.95	19.19	
Winkle Spruit ..	80.8	64.7	87	60	3.26	14	.71	19th	24.82	25.74	
Imbizana ..	82.2	64.7	92	60	2.44	15	.93	13th	23.96	28.03	
Mid-Illovo ..	78.3	59.2	98	52	4.52	17	.87	20th	27.42	27.37	
Port Shepstone ..	83.5	62.0	90	57	3.78	13	1.25	14th	24.53	27.62	
Umzinto ..	88.2	57.3	94	55	2.98	8	1.37	14th	27.51	26.82	
Richmond ..	78.7	59.2	100	52	7.76	17	1.38	19th	32.84	34.14	
Maritzburg ..	81.2	60.9	103	51	5.71	17	1.40	12th	20.37	24.71	
Howick ..	80.1	57.5	98	51	6.41	14	1.76	19th	22.19	27.40	
Ladysmith ..	87.4	60.3	103	54	3.85	18	1.24	10th	16.64	—	
Dundee ..	82.1	59.7	94	64	5.23	10	1.35	11th	18.46	29.41	
Weenen Gaol ..	89.6	59.4	106	50	6.12	21	1.70	10th	18.37	24.47	
Krantzkloof ..	77.1	62.3	91	57	6.18	16	1.20	20th	30.83	25.87	
Camperdown ..	79.4	59.5	101	60	3.64	13	.90	19th	16.75	20.21	
New Hanover ..	84.8	58.2	102	51	9.25	16	2.57	19th	30.27	28.68	
Krantzkop ..	83.0	59.9	99	49	10.20	14	3.14	19th	29.72	22.99	
Lidgerton ..	79.7	52.3	95	45	8.08	19	1.58	25th	26.17	28.05	
Nongoma ..	80.5	58.6	94	49	2.22	12	.54	11th	19.01	—	
Nottingham Road ..	77.0	51.9	93	42	7.36	18	1.70	31st	19.29	—	
Nqutu ..	78.7	50.7	89	46	3.97	11	1.60	10th	—	28.88	
Mtunzini ..	84.4	55.4	98	47	10.52	10	4.70	11th	53.83	39.51	
Flabisa ..	81.7	63.1	80	58	10.03	10	3.60	10th	—	35.06	
Melmoth ..	80.9	61.7	100	55	3.69	16	1.04	20th	—	22.10	
Ubombo ..	77.8	61.1	94	56	3.55	14	.70	13th	25.20	34.88	
Point ..	—	—	—	—	4.33	—	—	—	28.59	28.30	
Bulwer ..	—	—	—	—	10.09	—	—	—	31.39	36.14	
Ixopo ..	—	—	—	—	4.80	—	—	—	19.93	23.62	
Charlestown ..	76.8	50.8	87	41	4.15	14	1.10	31st	20.99	27.75	
Utrecht ..	84.7	45.5	92	40	4.33	6	1.81	17th	18.01	—	
Vryheid ..	78.8	57.3	94	50	3.47	10	.90	26th	22.87	—	
Ngomi Forest ..	74.3	55.7	87	50	8.80	20	1.75	14th	47.05	—	
Mahlabatini ..	83.4	48.0	92	44	2.98	10	.57	14th	23.30	25.61	
Empangeni ..	86.4	65.8	99	60	6.53	11	3.55	11th	33.72	27.01	

Meteorological Observations taken at Private Stations for the Month of January, 1910.

STATIONS	TEMPERATURE (In Fahr. Degr.)		RAINFALL (In Inches)						
	Maximum for Month	Minimum for Month	Total for Month	No. of Days	Heaviest rainfall in 1 day		Total for Year from July 1, 1909	Total for same period from July 1, 1908	
					Fall	Day			
Adamshurst	102	51	5.88	18	1.25	28th	20.39	25.21	
Hilton	93	50	8.60	18	3.29	19th	27.32	28.95	
P.M.B. Botanical Gardens	100	56	4.52	18	.89	19th	20.81	—	
Ottawa	—	—	3.75	16	.77	12th	23.44	25.11	
Mount Edgecombe	—	—	4.61	13	1.21	12th	28.06	25.99	
Umzinto, Beneva	—	—	8.26	13	0.36	14th	23.45	25.98	
Reit Vlei	—	—	6.32	17	1.08	12th	17.24	—	
Cedara—Hill Station	—	—	6.87	31	1.10	31st	—	—	
Vlei Station	95	50	5.82	23	1.17	26th	—	—	
Winkel Spruit	87	61	3.26	14	.71	19th	24.82	25.70	
Weenen	100	52	5.99	15	1.24	25th	17.48	—	
Giant's Castle	75.407	51.7	11.54	21	2.70	29th	27.76	28.50	
Umhlangeni	—	—	3.46	12	2.04	14th	—	28.79	
Eshowe	—	—	7.44	11	2.00	20th	—	—	

Coal and Labour Return.

Return of Coal Raised and Labour Employed at the Natal Collieries for the month of January, 1910:—

COLLIERY	Average Labour Employed					Output	
	Productive Work			Un-productive Work *	Total	Tons	Cwt.
	Above Ground	Below Ground	Total				
Natal Navigation ..	400	757	1,157	7	1,164	31,062	7
Durban Navigation ..	280	781	1,061	—	1,061	23,302	—
Elandslaagte ..	286	621	907	26	933	19,030	14
St. George's ..	229	491	720	—	720	17,771	—
Dundee ..	157	480	637	—	637	13,721	13
South African ..	159	419	578	16	594	13,455	4
Glencoe (Natal) ..	182	314	496	41	537	12,378	4
Natal Cambrian ..	216	420	636	7	643	12,160	11
Hobane ..	145	364	509	29	538	10,594	15
Talana ..	127	425	552	16	568	8,309	8
Hatting Spruit ..	83	186	263	14	277	7,217	18
Newcastle ..	75	319	394	9	403	6,939	16
Natal Steam Coal Co. ..	96	184	280	10	290	5,375	7
Ramsay ..	104	157	261	—	261	4,610	10
Burnside ..	43	124	167	232	399	2,142	14
Ballengeich ..	75	130	205	12	217	2,078	1
West Lennoxton ..	51	86	140	—	140	1,656	8
Mooklip ..	—	17	17	—	17	270	8
Dewar's Anthracite ..	7	7	14	—	14	80	—
†Vryheid ..	7	8	15	—	15	41	—
Makatees Kop ..	3	—	3	—	3	8	—
Totals ..	2,728	6,284	9,012	419	9,431	192,145	18
Corresponding Month, '09	2,608	5,270	7,878	419	8,297	139,864	15

	Productive Work			Un-productive Work	Total, Jan., 1910	Total, Jan., 1909
	Above Ground	Be'ow Ground	Total			
Europeans	210	190	400	72	472	391
Natives	1,023	4,152	5,175	226	5,401	4,699
Indians	1,495	1,942	3,437	121	3,558	3,207

* Cost charged to Capital Account.

† Includes December return.

Mines Department, Pietermaritzburg,
8th February, 1910.

CHAS. J. GRAY,
Commissioner of Mines.

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal Bunkered and Exported from the Port of Durban for the month of January, 1910:—

	Tons.	Cwt.
Bunker Coal ..	104,898	11
Coal Exported ..	23,869	7
Total ..	128,767	18

CHAS. WINNER,
for Collector of Customs.

Customs House, Port Natal,
1st February, 1910.

Return of Farms at Present under Licence for Lung-sickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	Natives ..	Boos-boom
A. B. Kos ..	Portion of Estcourt	"	Natives ..	Rooipoot
		"	H. Mattison ..	Cale tt
		"	W. Crouch ..	Oakh mpton
		"	H. Hattling ..	Driefontein
		"	H. Woods ..	Longwood
		"	R. J. Lund ..	Doveton
		"	J. L. van der Merwe	Winterton
A. C. Williams ..	Utrecht ..	"	Natives ..	Uitsoek
L. Trenor ..	Alfred ..	"	J. Davel ..	Nooyntroom
		"	Valwayo ..	Location
		Lung-sickness	J. T. Clothier ..	Whiteliff
		scab	E. F. H. Garland ..	The Refuge
J. R. Iffe ..	Lion's River ..	"	W. G. Shaw ..	Colb. urne
R. Wingfield Stratford	Newcastle ..	"	Smith - B. althwaite	Los Kop
G. Daniell ..	Vryheid ..	"	D. Neumann ..	Munro Wuket
		"	I. Havemann ..	Vengelegen
		"	L. J. de Jager ..	Scheulhoek
		"	N. M. Gunter ..	Krommelenbog
J. R. Cooper ..	Nkandhla & Nqutu	"	Natives ..	Roodepoort
E. Varty ..	Western Umvoti ..	"	" ..	Haladu
		"	D. C. S. Nel ..	Batshe
		"	H. Hansmeyer ..	Highfield
		"	Natives ..	Onrust
		"	Natives ..	Summerfield
		"	F. R. Nel ..	Vernmaak's Kraak
R. Mayne ..	Eastern Umvoti ..	"	Natives ..	Kran Vlei
		"	Native ..	Location
E. W. Bowles ..	Ixopo ..	"	C. J. H. Nel ..	Paul's Rest
A. H. Ball ..	Weenen ..	"	Natives ..	Batmand
		"	J. P. Lotter ..	Brg Vleit
		"	P. H. Van Rooyen ..	Buffels Hoek
		"	P. P. van Rooyen ..	Doornkloof
		"	Naude & Lotter ..	Scottshoek
		"	J. T. van Rooyen ..	Belle Vue
		"	P. M. Lotter ..	Waterfall
		"	P. H. van Rooyen ..	Buffels Hoek
		"	E. C. Robinson ..	M. m
A. J. Marshall ..	Dundee ..	"	Natives ..	Klipport
		"	" ..	Blinkwater
		"	" ..	Hartebeestfontein
		"	T. C. Koekmoor ..	Mayhole
		"	N. B. Swarts ..	Rooikop
		"	Lazarus Bros. ..	Goan Brae and
		"	" ..	Navigation Collie y
J. F. van Rensburg	Ngotshe ..	"	H. B. J. Bester ..	Town Lands
		"	M. J. Swart ..	Geluk
		"	Mrs. E. Wessels ..	Geluk
E. W. Larkan ..	msinga ..	"	Native ..	Vernmaak's Kraal
K. Ripley ..	Emtonjaneni ..	"	Native ..	Crown Lands, Beyela
		"	Natives ..	Morgenzon
		"	" ..	Crown Lds. Hed Hill
		"	" ..	Protest
C. E. Walker ..	Portion of Estcourt	"	Mrs. M. C. Marais	Malan Spruit
H. van Rooyen ..	Balamungo ..	"	W. Pretorius, Jun.	Welverloent
		"	Natives ..	Balamungo

The only way to prevent the use of insanitary and dangerous milk-cans is by close inspection on the part of the creameries and condenseries and city dealers. Cans should be examined frequently, and all rusty or broken vessels should be promptly condemned.

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :—

ON THE 2ND MARCH.

Bulwer—(1) One black and white Kafir goat ewe, slit right ear. (2) One white ewe goat, no ear marks. (3) One red goat, ewe, no ear marks, little white about head. (4) One black and white goat, ewe, hole in left ear. Impounded from location by order of R.M. (5) Running on the farm "Snowhill," Polela, and reported on the 15th January by Mr. R. B. Campbell as being too wild to be driven to the Pound, bay filly, black points, except off hind leg, which has a white sock, white star, nick out of back of left ear, height about 13 hands, unbroken, age probably three or four years.

Good Hope (Klip River Division) One merino lamb, ewe, about three months old, slit in left ear.

Hope Farm (Newcastle Division)—(1) Reported by Mr. J. Donovan as running on the farm "Paardeplaats," and too wild to be driven to the Pound, bay mare, aged, long main and tail, branded \dagger (2) Reported by Mr. E. J. Prozensky as running on the farm "Baboonsdell," \dagger and too wild to be driven to the Pound, bay mare, no brands.

Paulpietersburg—Four mixed goats, 1 dark grey, 1 reddish grey, 2 black, all females, and all have several slits in both ears.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Unkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

POULTRY.

Orders will be received for eggs for sitting of the following breeds for immediate delivery:—Buff Orpingtons, White Leghorns, Silver Wyandottes and Plymouth Rocks.

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Hairred Persian Rams will be booked for future delivery.

WOOLLED SHEEP.

Offers are invited for young imported Rams being Rambouillet Merinos, Lincolns, Hampshires, Shropshires. Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible:—

Admittance of Students to the School of Agriculture.—House Master, Cedara.
Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.
Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.
Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.
Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.
Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.
Agricultural Seeds, etc., for Irrigation Farming.—Curator, Govt Station, Weenen.
Fruit.—Orchardist, Cedara.
Accounting Business.—Accounting Clerk, Cedara.
Woolled Sheep, Woolled Classings, &c.—Wool Expert, Cedara.
Apiculture — Apiarist, Cedara.

E. R. SAWER,

Director, Division Agriculture and Forestry, Cedara.

Pigs like plenty of good water and grass. The man who can keep his pigs growing from start to finish is most likely the man who will make the best profit. The main object is to produce the gain at the least cost.—*Live Stock Journal*.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 123.—Married man, 35 years of age, with 5 years' experience on poultry and stock farm in California, wishes to get on to a farm in Natal. His wife is a good cook and handy in dairy. Would be willing to work for a very small wage or for their keep or a period of twelve months at least, after which they would expect some remuneration. Can produce first class personal references.

No. 124.—Practical man, age 35, unmarried, seeks position on any work. Can undertake or attend to any building work and erection of machinery, and has been accustomed to control of coloured labour. Could undertake management of small creamery. Not afraid of work. Has had considerable experience in Agriculture, and can produce highest references.

No. 125.—Single man, age 31 years. Was brought up on a farm in England. Is a tinsmith and plumber by trade, also has a good knowledge of carpentry. Speaks Dutch. Has been in South Africa for ten years.

No. 126.—Colonial, 35 years of age, desires to obtain a position as overseer or manager of an ostrich farm. Has been for some years with first-class farmers, and had charge of some of the best birds in the Cape Colony. Has a practical knowledge of incubating, rearing of chicks, dosing and general management.

No. 127. An expert fruit packer of four years' experience in Spain and France, and twenty years Colonial experience, is open to accept an engagement after 25th April next. He is open to accept low wages, with board and lodging, and fare to and from the Cape where he is at present.

No. 128.—Wishes to secure employment on a farm. States that he has a general knowledge of engineering, and has been employed on a large and well-known farm in the Richmond Division.

No. 129.—Wishes to secure employment on a farm. Experience in gardening and agricultural work generally, but more especially the former.

No. 131.—Age 20. Was a student at College of Agriculture, Cape Colony, where he gained a diploma. Has also won prizes for butter making at the Rosebank and Port Elizabeth Shows. Has been in the services of the Orangia Creamery Co., Bethlehem, which he left on account of conditions of employment not being suitable to his requirements.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

EMPLOYMENT FOR GIRLS.

The Minister of Agriculture has received a letter from the Chairman of the Transvaal Land Settlement Board, stating that he has been asked by several correspondents in England if there are any openings in South Africa, such as in creameries, for girls trained at Bromsgrove Colonial College and other such training centres in England. We should be glad to hear from any institutions or farmers in Natal who may be in a position to offer situations to girls who have been trained at such Colleges, when we shall be pleased to place them in communication with the Chairman of the Transvaal Land Settlement Board.

Agricultural and Other Shows, 1910.

DUNDEE (Dundee Agricultural Society).—Show, 23rd and 24th June. J. McKenzie, Box 105, Dundee, *Secretary*.

DURBAN (Durban and Coast Society of Agriculture and Industry).—Show, 6th, 7th and 8th July. J. Morley, 399, Smith Street, Durban, *Secretary*.

DURBAN (Durban County Farmers' Association).—Hold no Show, but an Exhibit will be arranged for at the Show held by the Durban and Coast Society of Agriculture and Industry. F. J. Volett, New Germany, *Secretary*.

ESTCOURT (Weenen Agricultural Society).—Show, 21st and 22nd June. E. Catherley, Estcourt, *Secretary*.

GREYTOWN (Umvoti Agricultural Society).—Show, 8th June. W. H. Gibbs, Box 24, Greytown, *Secretary*.

GREYTOWN (Umvoti Farmers' Association).—Date not yet fixed. C. J. Nel, Greytown, *Secretary*.

LADYSMITH (Klip River Agricultural Society).—Show, 17th and 18th June. W. J. Teasdale, Ladysmith, *Secretary*.

MID-ILLOVO (Mid-Illovo Farmers' Club).—Show held under the Mid-Illovo Agricultural Society. J. W. V. Montgomery, Ismont, Mid-Illovo, *Secretary*.

PIETERMARITZBURG (Royal Agricultural Society).—Show, 16th, 17th and 18th June. Duff, Eadie & Co., Timber Street, Pietermaritzburg, *Secretaries*.

PIETERMARITZBURG (Natal Poultry Club).—Show, 16th, 17th and 18th June, in conjunction with the Royal Agricultural Society's Show. E. G. Blundell, Box 250, *Secretary*.

PINETOWN (Pinetown Horticultural Society).—Show held 15th January, 1910. T. H. Trotter, Riverside, Pinetown, *Secretary*.

STANGER (Victoria County Agricultural Society).—Show, 9th June. H. C. Smith, Stanger, *Secretary*.

UNDERBERG (Himeville Agricultural Society).—Show, 9th April. G. Palframan, Watermead, *Secretary*.

SOCIETIES HOLDING NO SHOWS.

Bryne Farmers' Association; Boston Farmers' Association; Donnybrook Farmers' Association; Dronk Vlei Farmers' Association; Garden Castle Farmers' Club; Greytown Horticultural Society; Ladysmith Farmers' Association; Malton Farmers' Association; Polela Agricultural Society; Seven Oaks Farmers' Association; Umsinga-Biggarsburg Farmers' Association; Utrecht Boeren Vereeniging; Vryheid Agricultural Society.

Farm Apprentices' Bureau.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

- | | | | |
|-----|-----|---------|---|
| No. | 2. | Age 15. | Has had 18 months' experience of farming. Understands more about forestry than general farming. Speaks Zulu, and understands Dutch. |
| „ | 3. | Age 24. | Colonial born. Has a knowledge of bookkeeping. |
| „ | 13. | Age 20. | Is an orphan. Is anxious to learn farming. |
| „ | 15. | Age 19. | Is desirous of learning farming. |
| „ | 25. | Age 23. | Bricklayer by trade. Is anxious to get on a farm. |
| „ | 27. | Age 19. | Has had one year's experience on a farm in the Cape Colony. |
| „ | 30. | Age 15. | Transvaal born. Has had experience on a mixed farm. Speaks Dutch and Zulu. |
| „ | 34. | Age 18. | Has a slight knowledge of Zulu. Understands carpentry. |
| „ | 35. | Age 21. | Has had five years' experience on farms. Understands cattle and horses and Agriculture. Is anxious to get back on a farm. |
| „ | 39. | Age 19. | Has had twelve months' experience on a fruit farm in the Cape Colony. Speaks Dutch. |
| „ | 40. | Age 24. | Has had a little experience of farm life. Understands bee-keeping. Is anxious to get on a farm. |
| „ | 46. | Age 21. | Served a term of apprenticeship to a firm of agricultural implement makers. Industrious and level-headed lad. Very good references. |
| „ | 47. | Age 21. | Is anxious to obtain a situation on a farm. Has been in ironmongery trade for 2½ years. |
| „ | 48. | Age 18. | Has had 4½ years' experience in agricultural and stock farming in the Dundee and Ixopo Divisions. Has had a good deal of experience with cattle, but not much with sheep. Has also had experience with poultry and a little with bees. Is a good Zulu linguist. |
| „ | 49. | Age 21. | Colonial born. Has had three years' experience on farms, two years in the Mooi River Division and one year dairy farming in the Transvaal. Good references. Speaks Zulu. |
| „ | 50. | Age 15. | Has not had any experience on a farm, but is anxious to learn farming. |
| „ | 51. | Age 21. | Is very desirous of getting on to a stock farm. Is strong and healthy. Has had a fair training in bookkeeping. |
| „ | 52. | | Has had nearly 3 years' experience in farming; two years on an ostrich farm, and one on a general stock farm. |

The breeding or feeding of the pig cannot produce disease directly, but bad methods may so weaken the constitution and vitality that the animal becomes more susceptible than if in a vigorous and healthy condition.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

Charges in respect of Cattle and the Meat of Cattle.	Calves up to one year old.	Cattle over one year old.	
		Rate per single head.	After reaching 100 head in month.
<i>Abattoir.</i>			
1. Receiving, per head...	s. d. 0 3	s. d. 0 6	s. d. 0 3
2. Killing and Dressing, per head	2 0	3 6	2 9
3. Disinfectants	0 1	0 1	0 1
4. Cleaning Tripes, each	0 6	0 6	0 6
5. „ Sets Feet, per set	0 6	0 6	0 6
6. „ Calves' Heads. each ..	0 9	—	—
<i>Bagging Charges.</i>			
1. Per Body of Beef	1 3	2 6	1 9
2. Bagging Labour, per body	0 3	0 6	0 3
Hessian, 3d. per yard.			
<i>Special Storage Rates for Chilling up to 72 hours.</i>			
1. Chilling Beef, per body	1 3	2 9	1 9
2. Chilling Offal, per set	0 6	1 0	0 6

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg, 21st December, 1908.

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the Fund, Colonial Offices, Pietermaritzburg.

All correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

Notice.

Owing to the increasing demands upon our space, we have arranged to publish *quarterly* instead of monthly as hitherto certain standing reference matter. This matter will consist of (1) Scale of Charges for Vaccines, etc., at the Government Laboratory; (2) List of East Coast Fever Advisory Committees; (3) List of Executives of Farmers' Associations; and (4) List of Publications issued by the Department of Agriculture. In future readers will find this matter in the January, April, July and October issues of the *Journal*.

NATAL GOVERNMENT RAILWAYS.

RATES FOR S.A. MAIZE, KAFIR CORN, OATS, RYE AND WHEAT, FROM C.S.A.R. STATIONS FOR EXPORT OVERSEA BEYOND SOUTH AFRICA.

WITH effect from February 1st, 1910, the 506 miles limit now applicable to the export maize rate will be withdrawn, and the maximum rate of 10s. per 2,000 lbs. will apply to maize, kafir corn, oats, rye and wheat consigned from *any* C.S.A.R. Station to Point for export oversea beyond South Africa, subject to the conditions set forth in Clause 73, page 92, of Goods Tariff Book No. 23.

General Manager's Office,
Maritzburg, 24th January, 1910.

HEDLEY SALMON,
Acting General Manager.

SOUTH AFRICAN STUD BOOK.

A record of all classes of Stock; the object being to encourage the breeding of thoroughbred stock and to maintain the purity of breeds, thus enhancing their value to the individual owner, and to the country generally.

Application for Membership and Entries of Stock should be addressed:—

For CAPE COLONY ..	..	A. A. PERSSE, P.O. Box 703, Cape Town.
„ TRANSVAAL ..	..	F. T. NICHOLSON, P.O. Box 134, Pretoria.
„ ORANGE RIVER COLONY ..	..	E. J. MACMILLAN, Government Buildings, Bloemfontein.

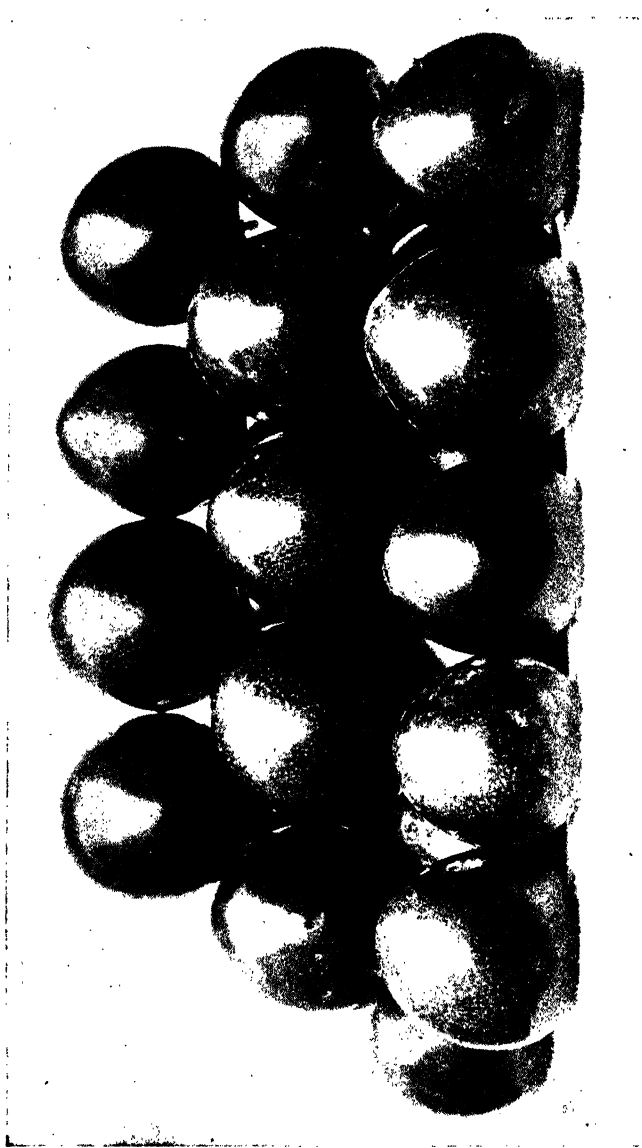
THE SOUTH AFRICAN STUD BOOK

IS OBTAINABLE OF:—

T. MASKEW MILLER,
ADDERLEY STREET, CAPETOWN.

PRICE 10s. 6d.

A. A. PERSSE,
SECRETARY, SOUTH AFRICAN STUD BOOK ASSOCIATION.



METHLEY PLUMS. (*Slightly reduced*)

(*See Article by Mr. C. Fuller*)

The Natal Agricultural Journal.

The Conservation of our Natural Resources.

1
North Carolina was, a century ago, one of the greatest agricultural States of the country, and one of the wealthiest. To-day, as you ride through the South, you see everywhere land gullied by torrential rains, red and yellow clayey banks exposed where once were fertile fields, and agriculture reduced because its main support has been washed away. Millions of acres, in places to the extent of one-tenth of the entire arable area, have been so injured that no industry and no care can restore it.

In these terms Mr. James J. Hill, in the course of an interesting and highly instructive address at the Conference of Governors of the United States, held in May, 1908, to consider measures to be adopted for the conservation of natural resources, referred to the present condition of agriculture in North Carolina, and it was thus that he drew attention to the evil effects which soil washing was producing; and the example of North Carolina he held up merely as an example of what is going on in many other parts of the great Continent of the New World.

Mr. Hill referred to the state of things which is being brought about by erosion of the soil in America, but he might easily have been referring to the condition of affairs in South Africa which is being produced by the same cause. Indeed, so serious is the question already becoming in this sub-continent that it is attracting the attention of all thinking men and threatens as time goes on to become more aggravated in its seriousness unless some steps are taken to counteract the evil. In the minds of many the effects of this erosion and destruction of the natural veld are so many indications of the drying up of Africa. That the possible approaching dessication of this continent may be one of the contributory causes of the destruction of our veld is a question which it is not our intention in the present article to discuss, as we propose to devote consideration to the whole subject on a later occasion. What we intend to discuss now is the question of the conservation of our natural resources. Naturally in such an article as the present it would be impossible to cover the whole ground, and all that we shall content ourselves with doing will be to draw attention to the necessity for better methods of farming—methods better designed to check the wastage which is at present going

on and the continuance of which must lead to the gradual impoverishment of the soil, and eventually, if still persisted in, to ruin.

There are two main directions in which the gradual ruination of our farming system can be looked for. These are, (1) Soil erosion, and (2) Soil deterioration; and under these two heads the question of the conservation of natural resources can be conveniently considered. The first of these—the erosion of the soil and its evil consequences—we referred to at the outset of this article. The extent of these consequences any thinking man will realise, and for him who does not think but will take the trouble to use his eyes the spectacle of dongas and grass-denuded veld which is far too common in South Africa will speak eloquently enough. Here is a fine word picture of what once was and what is now, in a certain district of the Old Colony, taken from the February number of the *Cape Agricultural Journal*. The writer is Mr F. H. Barber, of Greenhull, Grahamstown. He says:—

“About the year 1783, the great French Ornithologist, Le Valliant, visited South Africa on a bird collecting expedition. Fitting out his wagon, or wagons, in Capetown, he pioneered his way through what now are the districts of Caledon, Swellendam, Heidelberg, Riversdale, George, Knysna, Humansdorp, and Uitenhage. Crossing the Zuurberg and the little Fish River near its junction with the great Fish River, he pitched his camp on the banks of the latter, just about opposite to where our old friend Mr. (Taak) Delpoort now resides. Having fixed up his camp, he went out to shoot some game, and walked along the banks of the river. He first tried to get a shot at a hippo, but could not, owing to the dense reed beds that flanked the side of the river, which he described as a beautiful clear stream running level with its bank. Large pools and reaches extended for miles up and down. Hippopotamoi, crocodiles, flamingos, cranes, storks, pelicans and wild fowl of varied descriptions abounded, innumerable, and he described the country as a beautiful one, covered with rich grasses and shrubs. Gordon Cumming, Burchell, Cornwallis, Harris, Anderson, and the old pioneer Boers describe it in like manner further north, and it was difficult to see and shoot the smaller game for long grass.

“What a metamorphosis is there now!

“The beautiful clear reed bound river has become a dry, sandy sluit, like the Molopo and the Nosop, and the long, deep pools are substituted by level sand beds (a typical race course). The verdure-spread veld has become an arid wind-swept waste, where the half-starved tortoises, sad eyed, listlessly drags his weary body from one half dead karoo bush to a distant other.

“After Le Valliant came the white man with his flocks of cattle, goats and sheep. He is the culprit who unwittingly ruined the country by over-

stocking and the kraaling of stock, and brought to this pitiful condition this once fair land. He pitched his camp and built his house near some permanent water, and his ever-increasing flocks, as herbage became scanty, marched further and further afield, gradually extending their grazing area. Towards evening they marched homeward again and gradually deposited huge dung hills on the 'werf.' The best grasses were eaten up, pulled out, trodden out. The rich surface soil was trodden loose, sluits, cattle, sheep and goat tracks radiated like a fan from the homestead. Then came the thunderstorm. The rich surface soil manured by decomposed vegetation was swept in muddy torrents down deeply trodden-out stock paths to the rivers, and the clear and deep pools were filled up with sand and mud.

"This system of gradual impoverishment, detrition and denudation has been going on for nearly a hundred years, until we have in the place of the beautiful land described by Le Valliant the dry and arid wastes of to-day."

Mr. Barber rightly considers that we should assist Nature to recover her former conditions as much as we can—that is, "check, keep back and retain on the veld every drop of water we can. Progressive farmers are hard at the job now," he proceeds, "with dams, weirs, and irrigation works, camps to rest the veld, where reduced numbers of improved breeds of stock can graze and roam about at their own sweet will, instead of being driven backwards and forwards to heap up unsightly dung hills on the 'werf.' But a few swallows don't make a summer, nor will a few progressive farmers make a climate. It has got to be a universal job, and if we have lost the 'Okovango' River we have got to get it back, or an equivalent, in our own strong running rivers the Orange and the Vaal, and divert them in a great arterial system of canals and furrows, and flood the great, dry soils of the central Karoo."

This picture is probably but one picture in many of the changes which have been going on during the last fifty or hundred years in South Africa through the disturbance of the balance of Nature—the state of things which in all probability is having its effect in hastening the general drying up of the country. It is one of the directions, as we have said, in which we may look for the final ruination of our agricultural system, and its evil results must be counteracted by united action on the part of farmers all over the country. What is wanted chiefly, not only to avert the evil consequences of the soil erosion which has taken place in the past and to check erosion in the future, but also to restore the veld to its original humidity and richness, is water conservation, and, where necessary or practicable, the irrigation of crops. One of the evils which we have to contend with is the rapidity with which most of our rivers flow and the hilly nature of the country which causes the formation of torrents

in the rainy season, the result of this state of things being that the best of our soil is being gradually transferred from the veld to the sea. Streams must be dammed, the treading down of the veld by overstocking must be avoided, and every care taken to prevent the washing out of the soil in the rainy season: these are the chief measures which must be taken to combat soil erosion, and irrigation must be resorted to wherever necessary for the purpose of restoring the veld to its original luxuriance.

So much for the question of soil erosion. Considerations of space compel us to leave the subject here and to proceed to consider the second line along which the productive power of the earth is being lessened—namely, exhaustion by wrong methods of cultivation. The evil effects of soil erosion are great because of the sweeping away which occurs of the fertile surface into streams and thence to the sea. But the process of soil exhaustion, because it is universal and continuous in its effects, is even more ruinous. Every farmer knows that every crop removes from the soil a certain quantity of the substances which are necessary for plant growth; most farmers are aware that certain groups of crops remove certain ingredients in excess of others; but it is only a few farmers who realise that if this removal of plant food substances proceeds at more than a certain rate—if it proceeds, that is to say, more rapidly than the supply of those substances from whatever source—sterility will sooner or later be the sure end. There is not a farmer but will tell you that he understands crop rotation and who will scorn you if you even suggest that perhaps he is not following it quite as it should be followed, and yet how many farmers are there who are following a really intelligible definite system of crop rotation, a system having for its object the maintenance of the fertility of the soil? The danger of soil exhaustion where it existed ten years ago has increased manifold now that mealie-growing has been placed upon such a basis that, where the grain can be produced, the limit to its production is merely the limit of the farmers' resources—that as much of the grain can be marketed nowadays, without affecting its price, as can be produced. The race for wealth has been entered upon with doubled ardour, and in the excitement of the race such seemingly unimportant matters as crop rotation and the maintenance of soil fertility are lost sight of. Nowadays farmers will be planting the same land year after year with mealies just as their cousins in America have done with wheat, and if the practice is continued the result will be the state of things which has been arrived at in America—the exhaustion of hundreds of farms that were once almost renowned for their fertility.

In the United States within the last forty years a great part of the richest land in the country has been brought under cultivation. The yield per acre of the principal crops there should therefore in the same time have been proportionately raised, because the yield of old lands, if pro-

perly treated, tends to increase rather than diminish. Now, the year 1906 was one of large crops; for example, more maize was produced in the United States in that year than had ever been grown in that country in a single year before, and yet the average yield per acre was less than it was in 1872. Take also the case of wheat in the United States. Once upon a time New York was the great wheat-producing State of the Union. The average yield of wheat per acre in New York for the last ten years was about eighteen bushels. For the first five years of that decade it was 18.4 bushels and for the last five years 17.4 bushels. Farther west, Kansas takes high rank as a wheat producer. Its average yield per acre for the last ten years was 14.16 bushels. For the first five of those years it was 15.14 and for the last five years 13.18. In Minnesota the same diminishing returns are evident. For the same ten years the average yield per acre in that State was 12.96 bushels; for the first five years it was 13.12, and for the last five 12.8. In the United States the system of farming has been to choose the crop that pays best and grow it year after year until the soil is exhausted and will produce a profitable yield no longer; and then to move on to fresh fields and gradually to exhaust them also. This is what has happened in the United States, and this is one of the dangers which confront us here and which must be guarded against by our farmers by introducing an intelligent system of crop rotation and by judicious manuring. Manuring, however, must not be taken merely to mean the annual application of commercial fertilisers—which is the conception which many farmers have of it. The Hon. James Wilson, the Secretary of Agriculture of the United States, says:—"When you speak practically of the destruction of a soil it means that you have taken away that part of the plant food that comes largely from the atmosphere. That is what has been taken away; and good farming means the keeping up of that supply of organic matter in the soil—that is simply what good farming means. It is well enough to apply fertiliser if your system of farming is such that you cannot get a pasture. That is well enough; but the people in the Mississippi Valley never have used fertilisers, and let me tell you they never will." We must grow more green crops for manuring, and those crops should be legumes in order to increase the benefit to be derived by the soil.

Such are the main points of the situation—and the situation which our farmers, not only in Natal, but all over South Africa, must realise and strive to meet by the adoption of better, less wasteful, methods of farming and by increasing the water-conserving powers of the soil, artificially and naturally. We have felt it our duty to call the attention of our farmers to the need which is becoming increasingly insistent for more economical farming methods; and in future articles, as opportunity offers, we shall return to the subject and endeavour to develop it.



The Maize Crop in February.

LAST month, in summarising the reports received from our correspondents all over the country on the mealie crop, we found that the average condition of the crop on the 31st January, taking the Colony as a whole, was 2.0, or "fair," which represented a probable crop of $3\frac{1}{2}$ muids to the acre. During February, we are pleased to be able to record, the condition of the mealie crop improved considerably, until, at the end of the month, according to the reports furnished by our correspondents, the average condition was 2.52, or about mid-way between "fair" and "average." This increase of about five points represents an improvement in the prospects of the crop to the extent of nearly a muid an acre. The average yield per acre promised by the condition of the crop on the 28th February is 4.4 muids.

As we stated last month, in the schedule with which we supply our correspondents for the purpose of reporting upon the condition of the crop each month we ask to be informed whether the condition of the crop at the end of the month is "Poor," "Fair," "Average," or "Above the Average"; and in calculating these reports we use the figures 1, 2, 3, and 4, respectively, to represent these conditions, with decimals to represent intermediate conditions. Thus 1.5 means a condition of a crop which cannot be described as "poor," but which, on the other hand, is not good enough to be described as "fair"; in other words, it is a condition midway between "poor" and "fair." Bearing this method of representation in mind, the following figures showing the conditions of the crop in each of the Magisterial Divisions of the Colony at the end of last month will be found interesting. For the purposes of comparison we give the figures for the previous month also (in brackets):—Lower Umzimkulu, 3.0 (3.2) Alexandra, 2.7 (2.5); Umlazi, 2.0 (3.0); Inanda and Indwedwe, 3.0 (3.2); Lower Tugela and Mapumulo, 2.5 (2.4); Impendhle, 1.2 (1.0); Alfred, 3.0 (2.5); Ixopo, 2.7 (2.7); Richmond, 2.4 (2.2); Umgeni, 2.4 (2.4); New Hanover, 2.4 (2.4); Lion's River, 1.8 (1.8); Umvoti, 2.5 (2.2); Krantzkop, 2.8 (2.8); Underberg, 1.0 (1.0); Polela, 2.0

(1.0); Bergville, 2.6 (1.8); Estcourt, 2.3 (1.9); Weenen, 2.0 (1.6); Klip River, 2.2 (2.0); Umsinga, 2.0 (2.6); Dundee, 2.5 (2.2); Newcastle, 2.4 (2.2); Vryheid and Ngotshe, 3.2 (2.6); Utrecht, 2.3 (2.5); Paulpietersburg, 3.4 (4.0); Babanango, 3.0 (3.0); Eshowe, 3.0 (2.5); and Emtongeni, 2.8 (3.0). These figures, as we remarked last month, refer only to crops grown by European farmers, it being impossible to form any idea as to the extent or general condition of the Natives' crops at this early stage.

Carbonates and Nitrification.

It is well understood that by nitrification is meant the formation of nitrates from organic nitrogen in the soil, the first products being ammonium compounds, then nitrates, and finally nitrates, the whole process having for its cause the action of bacteria. Discussing this interesting question, our West Indian contemporary, *Agricultural News*, summarises the advantages of nitrification thus succinctly:—(1) Nitrogen available to plants is formed, (2) nitrogen is prevented from being lost through decomposition, (3) nitrogen which exists in the soil in a state useless for plants is made useful for them. It is obvious that, our contemporary goes on to remark, as the action is due to micro-organisms, the best way to render it as efficient as possible will be to stimulate the action of those organisms. It has been found that the rate of nitrification is dependent on the temperature, the supply of oxygen, the supply of moisture, the presence of carbonates, and the presence or absence of an excess of organic matter. In connection with the fourth of these, namely, the presence of carbonates, exhaustive investigations have recently been undertaken at the Georgia Experiment Station. The result has been to show, firstly, that nitrification is dependent on the amount of carbonate present; secondly, that of the carbonates magnesium carbonate has the greatest effect in stimulating the growth and action of nitrifying organisms; thirdly, that the nitrifying organisms of the soil do not depend to any appreciable extent on the carbon dioxide of the air for their supply of carbon.

To Destroy Moles.

In connection with the various hints we have published lately on the subject of mole destruction, the following plan, communicated by a reader to the Editor of the *Cape Agricultural Journal*, will be read with interest. The writer says the recipe is "certain death to the moles":—"Take a small piece of sweet potato," he says, "about the size of a shilling, and make several cuts in it. Then take a large grain of strychnine powder it, and put a little of the powder into each cut, being careful to close the cut again to prevent the powder falling out. It is much better to make

several cuts and distribute the powder in the bait, as being very bitter, the mole will eat round the poison if put all in one place. Feel for the runs with a dibble, and drop a piece of bait into each run, and leave the holes open. Do not touch the hills. The result of this treatment is one bait—one dead mole."

French Duties on Natal Products.

A schedule of the recently revised surtax and customs duties chargeable at French ports on Natal produce transhipped from other European ports, has been received from the Commercial Agent for Natal in London. We reproduce here the essential particulars of this schedule, as the information will doubtless be found valuable by exporters in this country. Mr. Harrison has converted the French weights and monies into their approximate English equivalents, and we accordingly give the latter. The schedule comprises naartjes, oranges, pineapples, maize, maize meal, wattle bark, wattle extract, wool, hides and skins, and tea; and, with the exception of wool and tea, the surtax on each of these is 30s. per ton. Wool is free, and on tea the surtax is 2½d. per lb. The import duty on each of these several products is as follows:—Naartjes, £10 per ton (nett); oranges, £6 5s. per ton (nett); pineapples, £4 per ton (gross); maize, £1 5s. per ton (gross); maize meal, £2 per ton (gross); wattle bark, 12s. 6d. per ton (gross); wattle extract, £1 17s. 6d. per ton (gross); wool, free; hides and skins, free if raw; tea, 1s. 6d. per lb. The total duty and surtax, per ton except where otherwise stated, is accordingly as follows:—Naartjes, £11 10s.; oranges, £7 10s.; pineapples, £5 10s.; maize, £2 15s.; maize meal, £3 10s.; wattle bark, £2 2s. 6d.; wattle extract, £3 7s. 6d.; wool, free; hides and skins, £1 10s.; and tea, 1s. 8½d. per lb.

The Milking Machine.

Recently, many investigations have been made into the practical value of milking machines, and whilst the results of some have been in favour of the mechanical milking of cows, others have not been as satisfactory as could have been wished. In our last issue we referred to the results of trials which had been made at the Nebraska Experiment Station, and the results of experiments with the Burrell-Lawrence-Kennedy milker—which seems to be one of the best on the market—conducted at another of the experiment stations in America have just reached us. The trials were made for twenty months with twenty-one cows, whilst the experiences of forty-one dairy farmers, covering periods of one month to over two years, were also obtained and have been summarised and published in the bulletin. For the present we must content ourselves with publishing the summaries which are given of the conclusions that have been arrived at, since we are unable just yet to afford

the space necessary for anything like an extended article. The experiences of the farmers referred to indicate that a majority of them are favourable to the machine. Some twenty-seven reported favourably, eight were undecided, and six were unfavourable. As regards the trials conducted at the experiment station itself, the conclusions arrived at are:—The success of machine-milking depends largely upon the man operating the machine; in herds of thirty cows or more machine-milking is both practical and economical; and the machine itself seems durable and efficient, provided it is properly cared for by an efficient operator.

The Value of Prickly Pear.

Senator McColl, who went as a delegate from Australia to the Dry Farming Congress in Wyoming, U.S.A., made extensive inquiries into the methods of utilising the prickly pear in the States, and he has presented a very valuable report to the Prime Minister on the subject. In this he refers appreciatively to the work done by Mr. Burbank at Santa Rosa in the development of a spineless cactus, which yields alcohol and glucose, fibre for paper, and highly nutritious food for stock. But he also gives details as to how the prickly pear itself is utilised, and how, by the use of a gasoline torch, something on the principle of a painter's blow lamp, skilfully applied, the spines are singed off the pear leaves, which become at once valuable food for stock. In Arizona and the dry States cactus thus treated is the staple food for cattle in dry seasons, and it is recorded in one instance that 755 head of cattle were kept from December to March on 860 acres containing prickly pear. Indeed, many varieties are cultivated as food, and Senator McColl records data showing how these operate both as a fattener of cattle and a milk-producing fodder. Some varieties even are manufactured into articles of human food.

The U.S.A. Department of Agriculture in its first bulletin on prickly pear summarised the results of the investigations as follows:—(1) The pear, though poor in nutrition, can supply food sufficient to save cattle during a time of drought. (2) The pear, if used in due proportion with other food, can fatten stock, and is a valuable accessory to the dairy if properly used. (3) Working oxen can be kept going on it, and cattle where it can be obtained can do with water three times a week during summer. (4) The spines require to be burnt off, as other processes still leave enough to be injurious. (5) Stock unaccustomed to it should be fed lightly at first, increasing the quantity until they consume as much as they need without injury. (6) As in feeding with beet pulp or any other green food, pear scours at first largely, and always some more or less, but this depends upon how much concentrated food is given. (7) Cotton-seed meal or cake was given, principally because it was easily procurable,

but any kind of dry food can be used. (8) The food can be used for cattle, sheep, goats, or hogs. (9) When any stock has only dry feed for a time, pear is most excellent for toning up the system. (10) The pear can easily be kept in subjection, but it would be a most severe calamity if it were allowed to die out.

For Wounds In Horses.

The *Farmers' Advocate* vouches for the excellence of the following recipe for making a good healing lotion for cuts and wounds on horses. It is made entirely from blue gum leaves, and, the *Advocate* says, has proved a wonderful remedy:—Boil, say, 2½ lbs. of good, bright, full-grown blue gum leaves to the gallon of water for four hours. It is then fit for use if required immediately. If bottled, it would ferment. Therefore, to obviate this, add directly the liquor is taken off the fire a quarter of an ounce of salicylic acid to a gallon of the decoction, and it will keep good for years. It is a good plan to add one part of glycerine to 20 parts of the liquid; but this is not absolutely necessary, though it certainly improves it by giving it a more oily nature. The glycerine, if added, must not be put in till the liquid is cool. To give it a better appearance, allow it to stand for a few days, then strain through flannel, but this also is not really necessary. "Even with the glycerine the mixture will not cost more than threepence per bottle, providing a fair supply is made at a time; and what a saving this will be everyone knows who has had to purchase veterinary remedies or employ a vet."

Potatoes : Cut Sets v. Uncut.

In a recent issue of the *Mark Lane Express* a correspondent discusses the question of cutting potatoes before planting and the value of the practice as compared with planting them whole. He remarks that, two years ago, if he remembers rightly, when Scotch seed was scarce, seed and ware were sent together and that farmers were glad to get it. Some samples were so large that it took 22 cwt. to plant an acre, when 17 cwt. would have been quite sufficient. "Personally," he says, "I do not quite agree with cut sets, the tuber is so apt to lose its strength and to shrivel. A good deal of cutting is done all over the country, and in some places tubers are cut to 'single eye sets.' This practice usually results in a few good-sized tubers being produced instead of many small ones. Sets soon begin to deteriorate after cutting, and should therefore be planted as cut. It is a good plan to rub the portions first in a mixture of two parts of flower of sulphur and one part of slaked lime to guard against bleeding and infection by fungus spores, and the sets when planted must be placed eye upwards. There is not so much done now as in previous years when the potato boom was at its height, as so few varieties are so precious now.

On nice kind silt lands the grower has a much better chance than the one who has heavy land, as the advantage of cutting is not so pronounced, and it should only be resorted to when stock runs short."

Soft Eggs.

Soft-shelled eggs are an item in the debit account of poultry-keeping which runs away with much of the profit. Too often no attempt is made to discover the reasons why these eggs should come at times in an unusual number, or to remedy the abnormality. Deficiency of grit supply does not by any means exhaust the explanations, although hens are always much the better for a free amount of lime in the diet. Still, a sufficient supply of lime and other mineral salts is obtainable from many foods and grains to enable the egg organs to turn out perfectly-shelled eggs, even if grit is denied. One great cause of membranous eggs, according to the *Illustrated Poultry Record*, is over-feeding, especially with animal substances; the eggs are formed more rapidly than they can be shelled. Another cause is to be found in over-stimulation of the ovary, either by sexual influences or spices in the food, the former brought about by too few a number of hens being mated with the male bird. And yet another reason of soft-shelled eggs is traceable to congestion of the oviduct through cold and chill, especially when hens are kept under conditions that entail paddling more or less incessantly in liquid mud. All these influences are within the province and power of the poultryman to counteract, and it is marvellous how the number of marketable eggs will be increased if a little care is taken to go carefully into things, first endeavouring to ascertain the cause, afterwards to take the requisite steps to rectify it.

Selection of Poultry Breeds.

In a bulletin issued by the Department of Agriculture of the United States some sound advice is given to poultry-keepers, on the selection of breeds, which should be taken to heart by all who desire to convert what is at the present time on most Natal farms a doubtfully profitable proposition into a sound paying undertaking. "A mistake is oftentimes made," the bulletin remarks, "in selecting fowls of a breed that is not suited for the purpose for which they are to be kept. If egg-production is the all-important point it is a most serious mistake to select a breed of fowls that is not noted for this product. If, on the other hand, meat is the chief object, an expensive mistake will be made if any but the heavy-bodied fowls are chosen. The small, active, nervous, egg-producing breeds cannot compete with the larger phlegmatic Asiatics for meat-production. Then, too, if fowls are kept for both meat and eggs some-breed of the middle classes should be chosen. These, while they may not

attain the great size of the Asiatics, are sufficiently large to be reared profitably to supply the table with meat and at the same time have the tendency for egg-production developed sufficiently to produce a goodly number of eggs during the year. The Wyandottes and Plymouth Rocks are good illustrations of this class of fowls. While individuals of these breeds have made excellent records in egg-production the records of large numbers do not compare favourably with the egg-production of the Mediterranean fowls."

Sheep Breeding Studies.

According to the *Agricultural Gazette* (London) the Agricultural Station of the University of Wisconsin Authorities have just made some interesting observations with regard to sheep-breeding, drawn from the records of 240 ewes and covering a period of five years. The normal period of gestation, or in other words the time from which the normal ewe is mated to the time of lambing, ranges from 145 to 151 days, and the greater per cent. of ewes will lamb 147 days after service. Flockmasters are all familiar with the fact that the percentage of lambs is greater in small flocks than in large. In these cases the flocks were small and of various breeds. As a result of five years' observations it was found that on a flock of from sixteen to twenty-eight Shropshire ewes the average annual increase was 166 per cent.; on a flock of Dorsets of from two to eight ewes 149 per cent.; on flocks of Shropshire-Merinos running from three to thirteen 144 per cent.; on a similar flock of Southdowns 142 per cent.; on a small flock of Oxfords (from two or four) 186 per cent.; on two to five Hampshires 152 per cent.; and on a similar flock of Cheviots the same average rate of increase. This shows what can be done with healthy ewes in small flocks.

The gestation period is longer with male lambs than with females, while the percentage of males born is practically the same as that of females. The larger percentage of the lambs born on or before the 147th day of pregnancy are strong, and from that time the number of weak and dead lambs is increased. The number of days which the lamb is carried, however, does not seem to have any effect on its size. The increase in this percentage is due to twin lambs, and in this there seems to be no difference between the breeds. Ewes six years old produced the largest percentage of increase, and young ewes the greater number of single lambs. A ram was at his best at two or three years of age. Ram lambs averaged about half a pound heavier at birth than ewe lambs. The larger the ewe the greater the percentage of increase, while the ram had no effect in this respect. The size of the ewe and not of the ram determined the size of the lamb.

"Farmer Boys' Pages."

On account of the extreme pressure upon our space this month, occasioned by the publication *in extenso* of the Commercial Agent's report on the export of Natal fruits, we are obliged to omit our usual "Farmer Boys' Pages" from this issue. Next month the feature will appear as hitherto, and in the meantime "Arator" will endeavour to secure something "extra good" for his growing circle of readers. He desires us to say that he has received three or four inquiries from readers which he will reply to be letter at the earliest opportunity, and replies to them will also appear in the next instalment of the "PAGES" for the benefit of other readers.

S.A. Poisonous Plants.

In our January issue we referred to the interesting and useful booklet on South African Poisonous Plants which has recently been issued from the pen of Mr. J. H. Walsh, of Capetown. Mr. Walsh has written to us asking us to state that copies of the book are obtainable from Mr. T. Maskew Miller, Capetown, who is the publisher. Those desirous of obtaining copies are therefore advised to write—and to write early—to Mr. Miller.

First Aid in Arsenic Poisoning.

Owing to the large number of arsenical preparations now being used in the Colony, it is considered that the publication of the following memorandum on "First Aid in Arsenic Poisoning," prepared by the Government Pathologist, may be of public benefit:—Owing to the widespread use by farmers and others of arsenic, arsenite of soda, and preparations containing arsenic, there have been of late years many cases of accidental poisoning by these materials, and not a few of these cases have terminated fatally. Cases in which the poison has been made use of with criminal intent have also become somewhat numerous of late. In view of these facts, it is possible that anyone may at any time be called upon to witness a case of arsenical poisoning. It is, therefore, desirable that a knowledge of the symptoms which usually arise and the best form of "first aid" in such circumstances should be very widely known. Among the many articles at present in use in Natal which are liable to give rise, when taken internally, to arsenical poisoning are:—Arsenate of lead, arsenic (otherwise known as white arsenic, arsenious oxide and arsenious acid), arsenite of soda, Alderson's dip, Cooper's "Tixol," Cooper's powder dip, Demuth's dip, Erkenbrach's dip, Holmes' dip, Laboratory dip, McDougall's paste dip, and Thomas's carbolic dip.

The illness practically always sets in before the expiration of an hour

after the poison has been taken, and usually about twenty-five minutes after. There is an acrid taste in the mouth and a feeling of nausea. Frequent vomiting sets in with great pain in the stomach. Diarrhoea appears, as a rule, soon after the vomiting has commenced. The victim may complain of cramps in the legs; he speedily becomes prostrated, his face is pale and his skin cold and clammy. Medical assistance should be at once sent for. Pending the arrival of a doctor, the following treatment should be adopted with the least possible delay:—(1) Empty the stomach; (2) Administer an antidote; (3) Give demulcents; and (4) Support the strength.

(1) The complete emptying of the stomach is of first importance. If vomiting has already set in it should be encouraged by large draughts of lukewarm water. If vomiting has not set in, and it is known or suspected that the poison has been taken, an emetic should be given. It may consist of either two tablespoonfuls of common salt, or one tablespoonful of ordinary mustard, in a tumblerful of tepid water. The vomiting which results should be encouraged by large draughts of tepid water. By these means the stomach may be well washed out. (2) The stomach having been emptied an antidote should be administered. All those who keep and use arsenical preparations should always have the antidote at hand; it should be kept in an easily accessible place and should be clearly labelled. The antidote may be either Wyeth's dialysed iron (one tablespoonful in a little water every 10 minutes, each draught being followed by a few sips of salt water), or a mixture made from the following:—Bottle marked "A," solution of perchloride of iron, three ounces: water, to eight ounces. Bottle marked "B," carbonate of soda, one ounce: water, to eight ounces. The contents of these two bottles should be kept separate. When the antidote is required, the contents of the two bottles should be mixed together in a large jug or basin. The mixture will effervesce and become turbid and reddish-brown. When the effervescence has ceased, the patient should drink half the mixture. The second half may be administered about one quarter of an hour later. (3) Milk, and the whites of eggs beaten up in milk or in water, should be given in abundance. (4) The patient should be kept lying down, the body should be covered with warm blankets and hot water bottles, say, be put to the limbs if these are cold. Small doses of brandy, or whisky, and warm water may be given to support the strength.

Basio Slag and Sulphate of Ammonia Compound.

A compound of basic slag and sulphate of ammonia would be an admirable manure for soils poor in lime, but hitherto an admixture of the two commodities has failed because the caustic lime in the slag gave

rise to loss of ammonia. According to an English contemporary, the *Chemical Trade Journal* now calls attention to a process invented by a German, who claims to have overcome the above drawback. The basic slag is mixed to a cream with water and then with a concentrated solution of ammonium salt containing just sufficient free acid to combine with the free lime of the slag. This adjustment of the amount of acid must be carried out with some precision, and the resulting mixture is heated in closed vessels connected with absorbing apparatus for the recovery of some ammonia which is usually set free, as it is found best to err on the side of adding too little acid rather than the reverse. The product is concentrated to stiff paste, dried and ground. It is found to be free from lime, and to have had its citrate solubility much less changed than would be the case were basic slag treated with the same quantity of sulphuric acid without simultaneous addition of ammonia salts.

A Useful Leguminous Plant.

According to our West Indian contemporary, *The Agricultural News*, an account recently appeared in *L'Agronomie Tropicale* of a leguminous plant, *Tephrosia purpurea* and its suitability for the purpose of keeping down weeds in the culture of rubber, coffee, and other crops. There have been attempts in many regions to introduce a plant which, while capable of keeping down others which are harmful, enriches the soil and does not do any harm to such trees as rubber. According to a planter in the Federated Malay States, *Tephrosia purpurea* fulfils this purpose admirably. This *Tephrosia* grows slowly at first, but toward the end of four months, it attains the dimensions of a small bush; it then commences to show superiority over other plants. When fully grown, it is 9 to 11 feet high. In plantations, it forms hedges across which no other plant can pass, and the necessary weeding near the plants costs little. The hedges are sufficiently distant to allow the air to circulate between the trees, and the soil is always well shaded and kept in good physical condition. As for the protected trees, these appear to make as good growth as they do on soil that is completely and regularly free from weeds.

The account goes on to show how a great saving in the expense of weeding follows the adoption of this plant in rubber cultivations. It may be remarked that several species of *Tephrosia* are common in the West Indies; among these are "goat rue" (*T. cinerea*) and "Surinam poison" (*T. toxicaria*). Of these, the former is a loosely spreading undershrub, which tends to run along the ground; stem 1 to 1½ feet long; leaflets ½ inch to 1 inch long; flowers about ½ inch long, red, appearing in February to June; pods spreading, with 5 to 10 seeds; found in open spaces,

thickets and on the seashore. *T. toxicaria* is an upright, larger plant, with an erect stem about 4 to 5 feet high; leaflets $1\frac{1}{2}$ to 2 inches long; flowers 2-3rd inch long and over, blue; pods about 2 inches long.

A New Mexican Fibre.

Our West Indian contemporary, in the same issue, also contains an account of an article which has appeared in *L'Agriculture Pratique des Pays Chauds* descriptive of a new Mexican fibre, the information concerning which was furnished by the American Consul at Manyanillo. The fibre in question is obtained from the plant *Centaurea salmantica*, a kind of shrub which attains a height varying from 18 inches to 5 feet. Its local name, *escoba*, which means "broom," is derived from the fact that the natives cut it every year, and, after having dried it, make small bundles of it, which they use for brooms. In those parts where it is abundant, large ropes are made from it in the following manner:—After cutting it, the natives sink the shrub in a slowly running stream for about two days, after which treatment the bark is easily removed. When it has been stripped and washed, it yields a long, delicate and silky fibre, which is very strong and of which the ropes are made.

The plant grows abundantly in open places, and when it is cut at the end of the season it makes a second growth which is sufficiently large for a fresh crop to be obtained from it after the following rainy season. It does not require any cultivation or replanting, and grows very vigorously. On account of the strength and durability of the fibre and the abundance of the plant a large industry will probably be established, as much for the manufacture of ropes as for that of the sacks which are used in every part of Mexico for carrying burdens on the backs of animals.

One of the commonest mistakes in feeding farm horses is keeping their mangers stuffed with hay. The better the hay the greater the mistake, on account of the greater temptation to over-eat.

As a rule it will be found that the best milking sow is also the most prolific and the best mother.

A sow is usually at her best from the second to the fourth litter; but there are exceptions to this rule.

Don't let the pigs root up the pasture. Ring them, or cut their snouts if they show any inclination to root.

Cement and Concrete Fence Posts.

By H. M. BAINER and H. B. BONEBRIGHT.*

THE average life of the best wood fence posts that have not been specially treated is from 12 to 15 years; while the poorer ones often last but from 3 to 5 years. Good wood posts are gradually becoming harder to secure and the cost of them is increasing each year. The cost of maintaining the farm fences and especially the posts is a great one when we consider that they must be replaced so often.

The cheaper and poorer grades of woods used for fence posts can be treated and thus made to outlast the best grades of untreated timber. The cost of the untreated post will vary from 5d. to 7½d. each, and the cost of treating them according to experimental data at hand will add from 5d. to 7½d. each to the first cost, thus making the total cost of the treated post from 10d. to 1s. 3d.

With the present enormous and increasing demands made upon our forests for all classes of lumber, shingles, pulp wood, cooperage stock, mine timbers, lath, wood for distillation, poles and fence posts, there is no wonder that the prices for these products are becoming greater. The cost of the average fence post is almost double what it was a quarter of a century ago, and in another quarter of a century there is no doubt but that its cost will be double that of the present.

Iron fence posts cannot be generally used as substitutes, as their cost is prohibitive. Stone posts are used in some localities, but they do not give general satisfaction and they cannot be profitable shipped.

Cement and concrete posts are just beginning to be manufactured and used as substitutes, and there is no doubt but that they will become more generally used. It is true that they may be considered as expensive, but they are long-lived, present a good appearance, and can be made by the farmer, providing the necessary materials are available. It is the purpose of this article to show how to make the posts and also to determine the best forms, mixtures, reinforcements, wire fasteners, cost, and general practicability.

MATERIALS TO USE.

Cement.—There are but two general classes of cements which could be used for post construction—Natural and Portland. The materials found in Natural cement are mixed by nature in approximately the correct proportions, and when burned does not always make a cement of uniform strength. Portland cement is mechanically mixed in chemically correct proportions. Portland cement makes a uniformly stronger mix-

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ture than the Natural cement and is always used where great strength is required.

In cement fence post construction, it is desirable that the post be made as light and as strong as possible, and thus it is practical to use nothing but the best grade of Portland cement.

Sand.—Clean, sharp sand with grains varying in size from small to large makes the best mixture. By clean sand is meant that which is free from clay, loam, or foreign materials. These tend to retard the proper setting of the cement and destroy its adhesive quality. In many sections mica is found mixed with sand in large enough quantity to seriously interfere with the strength of a mixture made from it.

Sharp sand is composed of sharp, angular grains of all sizes and makes better mixture than that which is smooth and round, or "river worn."

A sand composed of fine and coarse grains mixed is to be preferred, because less cement will be required to fill the voids than either used by itself.

Leaves, sticks, stones or gravel should be removed by screening.

Gravel.—The same general rules used in the selection of a good grade of sand will apply to gravel. It should be composed of clean, sharp pebbles of all sizes. For post construction, the pebbles must not be too large, as they will interfere with the proper placement of reinforcement.

Broken Stone.—Broken stone used for post construction must contain no large pieces as they will interfere with the placement of the reinforcement. It is necessary to use some sand with the stone to fill voids and thus save cement. It is not desirable to use soft sandstone, soft limestone, slates, or shale. Granite, hard limestones, and coarse gravel which has been crushed, is considered best.

Water.—The water used in making a cement or concrete mixture should be clean and free from alkali. Satisfactory experiments have not been conducted to show the effects of alkali water used in making a mixture of this kind, but enough is known as to its effect on cured cement constructions to justify not using it in the mixture.

PROPORTIONS.

On account of a difference in the total open space or voids in sands or gravel composed of different sized particles and also that more cement is required in some conditions than in others, it is often necessary to make a rough determination of the percentage of voids to the total aggregate. Where maximum strength is required about 10 per cent. more cement should be used than the total voids.

The determination may be made as follows: Secure a watertight box or pail of known capacity, fill it with the aggregate to be used so that when it has been well shaken it will smooth off even at the top. Pour

water of known amount into this until full. The volume of water used in proportion to the total volume of the receptacle determines the total voids.

For example, suppose the total volume of the receptacle in which the aggregate is placed is 2,032 cubic inches and that it takes two gallons of water to fill it. One gallon of water contains 231 cubic inches and two gallons would contain 462 cubic inches. The total volume of water used, divided by the volume of the receptacle holding the aggregate represents the proportion of voids. Thus, 462 divided by 2,032 equals 22.73, or the voids make up 22.73 per cent. of the total volume. For the maximum strength 10 per cent. should be added to this. Ten per cent. of 22.73 equals 2.27. By adding this 2.27 to 22.73 we obtain 25, or, in other words, 25 per cent. of the total volume should be cement. The mixture in this case would be represented by one part of cement to four parts of aggregate.

The proportions used in the constructions of the fence posts in this article varied from 1 part cement and 3 parts of sand to 1 part of cement and 5 parts of sand. In others gravel was used in the proportion of 1 part cement, 3 parts sand, and three parts gravel. It is a difficult matter to use broken stone or gravel in large quantity and place the reinforcement properly.

Measure all materials in correct proportions. This may be done with a shovel, a pail, wheel-barrow, or barrel. It will usually be advantageous to measure the water, especially where small quantities are mixed or where the same amount of mixture is made several times.

MIXING.

Hand Mixing.—Where the mixing is done by hand, a flat water-tight platform, or shallow box is convenient. Measure the sand and place it in a uniform layer and over this spread the proper amount of cement. Mix this thoroughly before adding water until it shows a uniform colour. The rule is to shovel it over at least three times. Now spread out the mixture, making a sort of basin in the middle into which the greater part of the water may be poured. Work in the dry edges until the water disappears, then add enough more water in small amounts to make the mixture of the desired consistency. Do not mix more material than can be used in twenty minutes.

Machine Mixing.—It is usually customary to use mixing machines on large jobs. It is not only economical, but does better work. Where power is available it is often advantageous and economical to construct a mixer for small jobs, also.

A small mixer can be cheaply constructed which can be driven with a two or three horse-power gasoline engine. With this, it was found that two men were able to do the work of at least four men doing hand mixing, and the machine work was done more thoroughly.

In many instances, mechanical mixers, which are driven by hand power instead of by an engine, are better than hand mixing with shovels or hoes. A mixer of this kind can be made from a barrel or box, pivoted in the centre and driven by means of a crank on which one or two men can work.

The mechanical mixer first mixes the materials in a dry condition, then some provision is made for turning in the water without stopping the machine. With most mixers of this kind, one revolution does as much mixing as one turning by hand. Six turnings by hand are considered enough, and it is seldom that a machine is stopped with less than double this number of revolutions; in fact, it may be turned 15 or 20 times; thus this method of mixing is very much more thorough and desirable.

HOME MADE CONCRETE MIXERS

To many people, the idea of mixing the concrete by hand appears to be an unnecessary task. But the price of a modern concrete mixer is so large that it would not be good economy to purchase one for what little mixing is done on the average farm.

The ingenious farmer will find that a suitable mixer may be constructed at home with little expense and work. All that is necessary is the ability to put a few pieces of old machinery together in such a way that the barrel or box may be turned upon an axis and stopped at the desired time. This is very easy in case the power is furnished by hand, but in case of a power-driven mixer, more ingenuity is required.

The home made mixer shown in the cut illustrates how a few pieces of board and timber may be turned into a very serviceable machine. Two pieces of 4 x 6 from the sills. Upon these, two uprights about three feet high are fastened. A 1½ inch pipe passes through holes bored in the top of the uprights. Upon this pipe the mixing box is turned, and through the pipe the water is added to the mixture at the desired time. The water is poured in at the top of the upright pipe and flows down and out through holes which are drilled in the lower side of it. The other end of the pipe is closed by a wooden plug. The ends of the box are made of pieces of 2 x 8 bolted together. A hole bored in the centre of each end forms the bearings. The sides of the box are made of one-inch lumber and are simply nailed to the ends with 12d nails. One-half of the box is made so that it can be detached and lifted off when the mixer is to be filled, or emptied. The detachable half is secured to the other half by means of strong hooks so placed that by slipping this half about an inch to one side all of the hooks are loosened at once. After it is in position, the removable portion is held in place by means of a barn door latch.

The driving gear is simple but very effective. It consists of the rim taken from the wheel of an old "rubber tire buggy." With the tire re-

moved the grooved rim makes a very satisfactory wheel upon which to run a $\frac{1}{2}$ -inch rope belt. The belt is driven by a small shieve pulley which is fastened to the counter shaft. A belt tightener is used upon the rope, and by using a very loose belt, the tightener is made to act as a friction clutch.

This particular mixer is driven by a two-horse gasoline engine, which is belted to the counter shaft. The engine runs continuously, and the mixer is started and stopped by means of the belt tightener.

The operator first fills the mixer about half full of sand, gravel and cement in the correct proportions. He next lowers the lid, which until this time has remained supported upon the hook. The lid is now pushed into place and the latch fastened. The supporting hook is next removed from the staple in the lid and hooked into a staple in the lid support. The machine is now ready to start, the clutch is thrown in, and the box revolves upon the pipe. When three or four turns have been made, water is poured into the upright pipe until the desired amount has been added. By this time the concrete is thoroughly mixed. The clutch is loosened, the box stops revolving, the hoisting hook is hooked in the staple of the lid, the latch is loosened and the lid raised to the top of the lid support by means of the counter weight and rope. Now, by slightly setting the clutch, the contents of the mixer are dumped into the box beneath. The operator of the machine may now refill the mixer, while the other workmen take care of the mixed material. In this way a large amount of material may be run through the machine and perfect mixing is guaranteed.

Many other systems of driving might have been used in place of the rope belt. The main gear of an old self-binder makes an excellent gear for a mixer. An old mower gear may also be put to good use in this connection.

It is not necessary to have the mixer driven by an engine or horse power. A crank may be attached and the machine turned by hand. Many prefer turning such a machine rather than mix the concrete with a shov el.

(To be continued.)

All agricultural federations and all administrative bodies, as well as any authors or editors who may wish to send to the Congress documents, statistics and official or private publications relating to the programme of the Congress, may send them to the Library of the International Congress of Agricultural Associations and for Rural Demography, 1, rue du Musée, Brussels. The 10th section of the Congress will publish a complete list of the documents sent in.

Export of Natal Fruit.

REPORT BY COMMERCIAL AGENT.

SEASON 1909 AND FUTURE PROSPECTS.

THE Commercial Agent for Natal in London (Mr. Harrison) has submitted to the Government the following report on the export of Citrus and other Natal fruits to England:—

In submitting this Report it will be convenient that I divide it into two parts—Past and Future.

EXPERIENCE OF PAST SEASONS.

The success attending the export of Citrus fruit through the Government agency in 1908 has been fully dealt with in the Report by Mr. Claude Fuller, Chief of Division of Horticulture, and issued as a supplement to Volume XI., the *Natal Agricultural Journal*.

The following statement gives the figures of Citrus fruit exported during the past season:—

STATEMENT OF CITRUS FRUIT SHIPPED THROUGH GOVERNMENT AGENCY, 1909.

No. of Ship- ment.	Date of Arrival.	Name of Steamer.	Naartjes and Orangettes.		Oranges.	
			Trays.	Boxes.	Large Boxes.	Small Boxes.
1	June 5th ...	Walmer Castle ...	526	56	...	...
2	June 12th ...	Kinfauns Castle ...	669	15	2	13
3	June 19th ...	Saxon	1,409	11	42	12
4	June 26th ...	Kildonan Castle ...	1,645	161	191	...
5	July 3rd ...	Briton... ..	3,393	154	249	...
6	July 10th ...	Kenilworth Castle ...	3,567	72	177	...
7	July 17th ...	Carisbrook Castle ...	3,445	201	180	...
8	July 24th ...	Armada Castle ...	4,140	345	173	...
9	July 31st ...	Norman	2,651	327	137	...
10	August 6th ...	Inanda	795	18	...	...
11	August 7th ...	Walmer Castle ...	1,935	519	118	...
12	August 14th ...	Kinfauns Castle ...	1,550	308	28	284
13	August 21st ...	Saxon	1,829	...	26	159
14	August 28th ...	Kildonan Castle ...	1,022	...	...	106
15	September 4th	Briton	970	...	66	175
16	September 11th	Kenilworth Castle .	727	...	26	43
17	September 18th	Carisbrook Castle ...	...	5	33	103
			30,273 contain- ing 16-40 fruits.	2,192 contain- ing 120-200 fruits.	1,448 contain- ing 100-225 fruits.	895 contain- ing 50-90 fruits.

In reviewing the past season's work it must be borne in mind that the Citrus fruit exported in 1908 was only about *one fourth* of that handled last year.

Of the difficulties in London I could write at great length. I do not propose to do so in this report. What we want to get at now are plain facts, and the causes of non-success, as a guide to the future.

There were too many naartjes on the market; the state of the fruit trade uniformly bad throughout the country; the summer the coldest and wettest for many years, on top of which there was a glut of soft fruits, especially strawberries and cherries, at unusually low prices. Then one of the worst features of all was the bad condition of a large percentage of shipments and the rapid breakdown of the fruit after being placed on the market.

There was such a general disinclination to touch naartjes, that if the supplies from all sources had been placed at public auction, arriving as they did for several weeks in quantities equivalent to about 7,000 trays, things would have been much worse.

Consequently I placed largely with private salesmen and distributed to the Continent and the big provincial towns, and also had a very large number of trays repacked by Messrs. T. J. Poupart, who throughout assisted me in every possible way.

Much there was that would not bear repacking and inevitably had to be got rid of "under the hammer." But invariably the good-conditioned fruit from other senders, notably the Natal Fruit Growers' Association, was offered first, or on days that would not clash with ours, so that the wasty stuff should not spoil the market.

I respectfully emphasise the point of the greater loss which was saved private shippers by my not burdening the public auction with all the heavy consignments sent through the Government Agency. Had I done so the prices now recorded would have been very much lower.

In regard to price for our *sound* naartjes, I challenge comparison with the prices received by others. Taken on the total shipments, our great waste, of course, placed the returns at a disadvantage.

I have referred to fictitious values; 3d. and 4d. retail for a naartje is a fictitious price. The number of persons who can afford to pay such a figure is extremely small. Prices are entirely governed by "supply and demand," and when you exceed the demands of an exclusive and limited clientele who will pay anything for a "novelty," and come to cater for the ordinary trade, then only ordinary prices will be paid.

It is a fallacy to believe that because the naartje, or anything else for that matter, comes from the Colonies that the British public "rush at it." They do nothing of the kind. They ask for sound fruit at a fair

price; where it comes from is a secondary consideration with the majority of people.

If the naartje arrives in small quantities and it is wanted, keen competition will beget high prices. If it arrives in big quantities and sound, then it will have to compete as a "fruit" with other varieties on the market at the same time.

But to export it at a profit is the chief consideration, and this question I will deal with later.

Unquestionably the very worst fruit placed on the market and the most roughly packed were the last three or four shipments of naartjes which arrived here after the Government Agency fruit had ceased.

Fifty to seventy-five per cent. of rotten fruit in a tray was common. The fruit, too, was inferior.

Cabled information as to condition of fruit and the range of prices at auction and private sale was regularly sent to the Colony, and advice was tendered to ship only the finest, firmest, and cleanest naartjes, eliminating all "puffy" and speckled fruits in order to reduce the shipments. It will be understood, however, that before a reliable estimate could be formed as to the prospects in the Home markets, five or six weeks' shipments were either on the water or were being packed.

In addition, Reuter's kept the Colony informed of the condition of affairs each week.

The chief cause of the wastiness last season is, I think, correctly attributed to the multiplicity of handlings.

The naartje is a delicate fruit and requires to be treated with the same respect as an egg.

The wet season, too, developed the inherent weakness of the fruit and added to the risks of breakdown. The same difficulty is experienced with the Coast-grown fruit of Spain. A wet season means a very much greater percentage of waste. At the same time it is also probable that owing to the prodigality of fruit insufficient care was used in picking and curing, and in this regard the past season will have taught a wholesome lesson.

After all the export was still in the nature of an experiment.

The centralisation of the packing had to be tested.

Then, too, the 1908 export was not a fair test, and it was necessary to ascertain the capacity of the London, Provincial and Continental markets for absorbing much bigger quantities, and the most reliable methods of sale.

Here, again, the lessons have been instructive, as I shall demonstrate in the following section.

It should not be overlooked that Natal's experience of losses is but a repetition of history in the development of an oversea fruit trade. Take

Australia, for instance; they were years before they achieved the success which they can now commendably attach to themselves.

Whole cargoes of wasted fruit were, I am informed, destroyed. But they persevered, correcting their previous errors, and out of bad beginnings a flourishing industry has been evolved.

Growers must not therefore be discouraged, for I am confident that with patience and due regard to the requirements of the Home markets, and a scrupulous following of the instructions laid down for their guidance, both in the cultivation, picking, packing and marketing of Citrus fruit, success will be secured.

NOTES FOR THE FUTURE.

Under the following heads I deal with the arrangements recommended for the future, based on expert advice obtained, and on personal observation and experience:—

PACKING FOR EXPORT.

This should be done on the farms. The Government would be rendering good service to the industry by appointing competent travelling Inspectors to visit the farms and see that the regulations laid down are faithfully observed, instruct in the correct methods of packing, and generally see that the picking, curing, selecting and packing is properly carried out. A careful watch should be kept on the shipments packed for export companies or persons other than the growers or fruit associations.

QUALITY OF FRUIT.

Only the very best fruits should be sent forward, *i.e.*, the good-sized, bright, well-coloured, clean-skinned, naartje, firm to the touch (called on the market “tight skins”). Loose, skinned—“puffy”—and all speckled and undersized fruit should be kept back.

If this advice is disregarded there will again be a loss, and the industry will suffer a severe set-back.

SIZE OF TRAYS AND BOXES.

Tray Fruit.—Experience has shown that the tray previously used is too large to be exported in quantities. On this account but few could be sold as original packages; the fruit had to be sold at so much each or per half-dozen. I am speaking now particularly of the retail fruiterers.

The consequence was that the demand being slow and the risk of waste very great, the fruiterer took fewer trays than he might otherwise have done, and to compensate for loss and tardy sales, expected to make 100 per cent. profit—in some cases more. (I have seen South African naartjes offered in the windows at a price which meant a profit of 250 per cent.)

With a lesser sized tray, about half the size and under, attractively got up, there would be a greater sale, inasmuch as it could be offered in the original package at a less price to return a quicker and consequently smaller profit. Further, where the fruit is sold out of the tray the amount of wastage would not be so great with a small tray as with a large one, and the turnover being more, prices and percentage of profits less.

Small profits and quick returns are essentially necessary to the development of a big naartje trade.

The Spanish people pack in trays of one count, viz., 25s. The trays vary in dimensions according to the size of the fruit, which is denoted in millimetres on the packages. This method should be aimed at as nearly as possible in Natal, except that, as our fruit is larger, fewer would be packed to a tray.

Probably a tray 12 in. x 12 in. x $2\frac{1}{2}$ in., and a lesser size 9 in. x 9 in. x $2\frac{1}{2}$ in. (outside measurements), containing 18 or 20 fruits, would be most suitable. This is confirmed by Covent Garden. A number of double-layer trays, say, 4 in. or $4\frac{1}{2}$ in. in depth, should also be tried.

The provincial and suburban demand could doubtless be greatly extended with a small tray.

The brands last season packed in the smaller trays containing an average of 18 fruits were the best and most tasteful package of all the Government shipments. They were quite popular, and good prices were obtained.

The small "Glove" box (punnet) containing 10 and 12 fruits also obtained a ready sale.

I have faith in this novel sized box. It contains just the quantity that would appeal to the ordinary housewife out shopping, where the 18 to 20 fruits were too many for the week's consumption.

Boxed Fruit.—For limited quantities of the *largest and best quality* fruits the present box is suitable, but too large for the smaller naartje.

I recommend a box about two-thirds the size of the present one—100 to 120 medium-sized fruits, but all of *good quality*.

Closed Packages.—When conveyed in cool chamber I consider that the packages should be closed. The naartjes that carried perfectly last year were in closed trays and boxes.

Another advantage is that when the fruit breaks down the juice does not escape and run over the other trays and give them the appearance of also containing wasty fruit whether they do or not. This is an important point, especially when the fruit is put up to auction.

STANDARD PACKAGE AND GOVERNMENT INSPECTION.

Standardised sizes of packages both trays and boxes, should be adopted as soon as possible, and a system of Government inspection and grading brought into operation on the lines of the Acts in force in Aus-

tralia, Tasmania, and Canada, and, in a measure, recently introduced by the Cape Government.

STYLE OF PACKING.

While one of the chief requirements is perfection of fruit, perfection of packing is no less important. In the latter respect the standard set by Mr. Fuller has received the "hall mark" of approval of the best authorities at Covent Garden. In this he has rendered the industry an invaluable service, and his standard should not be departed from. Nothing less attractive will do.

Uniformity in style of packing should be aimed at by all senders. The "Extra Special" fruits should be packed in similar manner to last year, with silver paper.

The editor of the *London Fruit Grower*, whose opinion is always worth having on such matters, has made the suggestion that a few of the fruits in the centre of the tray should have the wrappers turned down to reveal the fineness of the fruit

"NAARTJE" OR "MANDARINE."

The word "naartje" is not liked or understood on this side. Amongst the dealers the fruit is invariably referred to as the "Natal mandarine." And it is the Home dealer and buyer that we have to please.

To those ignorant of its origin, the word "naartje" conveys nothing of the nature of the fruit, whereas mandarines and tangerines, which have been on the market for many years, are household words.

I therefore suggest that while the word "naartje" may be retained, it should be accompanied by the word "mandarine."

MARKS ON PACKAGES AND WRAPPERS.

The stamping on the ends of the trays and boxes of the initials and/or brand of the grower or association, and the number of fruits, needs no alteration, except that they should be as bold as possible, for many clients buy on the brand or initials, and these cannot be too easily distinguished.

The wrapping papers should have a striking design. The "gold papers" express a better quality of fruit.

BUNDLING OF TRAYS AND BOXES.

The iron-hooping is not altogether satisfactory. It is a source of much annoyance and abuse. It is difficult to remove and tears the trays and boxes, and frequently the hands of those who have to take it off.

I suggest, if the smaller trays are adopted, that they should be tightly bound by strong wire in bundles of 10 (or battens placed round a larger number and firmly secured by flat straw rope like the Spanish).

The bundling of boxes in three's makes too heavy a package. Two's would be more convenient to handle.

Some Jamaica growers nail narrow strips of hide to their boxes.

METHODS OF CONVEYANCE.

For naartjes I am convinced that cool chamber conveyance is the only satisfactory method—at any rate so far as Natal is concerned.

Experiments were made during the past season by ventilated hold with disastrous results.

The orange is a hardier fruit, and, while the ventilated hold conditions are by no means ideal, given a dry season preceding export, the wastage should not be great. The midlands and up-country oranges carried much better than the coast.

Unfortunately the past season was a wet one, and all of our coast oranges broke down very badly; even the few sent in cool chamber showed such an amount of waste as to leave the margin of profit a very small one.

TEMPERATURES.

The temperatures in the cool chamber averaged 36 degs. to 38 degs. In the hold the variation was from 55 degs. min. to 85 degs. max.

Citrus fruit from the West Indies and Florida is carried in special fruit chambers at a temperature of between 45 degs. and 50 degs. If provision could only be made on the African service to carry Citrus fruit at those temperatures without resorting to the expensive cooling process now adopted, necessitating so high a freight as 60s. a ton, the handicap in building up a profitable business would be considerably reduced.

FREIGHTS.

The continuance of the heavy freight will operate against the expansion of the industry. It is true that the Union-Castle Company have expended a large amount of money in providing cool chamber accommodation, and with the comparatively small portion of that space which is now monopolised, the narrower margin between cool chamber and ordinary freights of other lines outside South Africa, may be held to present an unfair comparison. At the same time where it is proved, as in the case of the naartje trade, that under existing conditions whatever profit can be made is bound to be small, and that the reduction of the cool chamber freight is necessary to firmly establish the industry and thus increase the quantities exported and more quickly fill that space, I cannot but believe that the Steamship Company would be willing to assist the Colony as it has shown itself ready to do in other directions in the past.

It is a matter which the growers and fruit associations, in combination, should at once take up with the Shipping Company's representatives in anticipation of next season's export.

I venture the opinion that the *most* the Citrus fruit will bear is a cool chamber freight of 50s. per ton.

The ventilated hold freight of 25s. per ton I do not regard as unreasonably high.

It is a pleasure to record that the arrangements made at Southampton for working out and loading up of the fruit are all that could be desired, and that I have on all occasions received the utmost courtesy and assistance at the hands of the Company's officials.

QUANTITIES FOR SHIPMENT NEXT SEASON.

The quantities received at the height of the season last year were about 6,000 trays a week, and about 300 boxes—equal to another 1,500 trays—or 7,500 trays from all sources. This was much more than the markets could take. A large portion of these contained fruit of an inferior quality, for which there is no demand except at "Coster" prices.

By a careful selection of the fruit for export in the coming season, keeping back all second and third quality naartjes, the quantities should be considerably lessened.

I should recommend starting with not more than 1,000 small trays (or the equivalent) and 50 boxes (*green fruit should not be sent*) to arrive, says, the first week in June, increasing gradually to 2,000 trays and 150 boxes, and if the London Agents report a free sale, increase the quantities as they advise.

They will be guided, too, by what the other Colonies are sending.

But during the strawberry season (from the middle of June to the second or third week in July) the quantities should be regulated according to the cabled information as to prospects of a full or short crop.

PRICES.

By a careful disposition of supplies and the fruit better in quality and condition, the prices, comparatively, should be higher than last year. It is impossible to forecast what they will be. It all depends on the demand for mandarines, and the amount of fruit on the market, and the state of the weather and trade.

I might hazard the opinion that they will run from 9d. to 1s. 6d. per small 12-in. tray, and about 3s. to 6s. per box. If the supplies are not too heavy, a mean price may be realised. Of course, at the beginning, with smaller quantities, higher prices may be obtained.

It is, however, undesirable to obtain too high prices to start with. They are misleading and only cause disappointment. Besides which they put a check on free selling.

In future years, if the standard of excellence is maintained, the demand should increase with corresponding advantage to the grower.

DISTRIBUTION AND METHODS OF SALE.

AUCTION AND PRIVATE SALESMEN.

The matters of distribution and methods of sale are contentious and complex, and erroneous impressions may easily be formed, but from a careful and unbiassed study of the question, I have come to the conclusion:—

That in introducing a new fruit both the auction and private salesmen should receive consignments for sale in order to get it advertised and test its value.

That when regular supplies are not too bulky and the fruit is in good condition, the private salesman will secure better nett results. Furthermore, he is in a position to have the fruit repacked, whereas at the auction it is sold as it stands, and often a little waste in one box will condemn the whole bundle to prices which do not represent the true value.

That while sole monopoly of sale is undesirable, a too great splitting up of consignments amongst salesmen in the same market is equally to be avoided.

That when fruit arrives in a general wasty condition it should be put up to auction at once.

That when it appears that the consignments given to appointed private salesmen are too heavy for them to clear before arrival of the next shipment, the quantities placed on the market should be regulated, the private salesmen's weekly supplies be reduced, and if necessary the auction employed to accelerate distribution.

COVENT GARDEN.

Covent Garden is the recognised fruit market of the United Kingdom, to which buyers come from all parts of the country.

As a distributing centre its position is unique.

There may be times when provincial markets show better figures; there may also be times when it is expedient, or as an experiment, to get the fruit out of London, as with our *naartjes* last year, but, taken on the whole, in returns and in celerity and breadth of distribution, the advantage of Covent Garden is unassailable.

To a great extent it sets the price of fruit, and the provinces are guided by it.

By concentrating here all the trouble and expense of extra cartage, high railway carriage, possible breakdown of fruit from extra handling, delays, etc., are avoided, and the rendering of account sales, another important matter, is also facilitated.

Should the time arrive—and I hope it is not impossible—when a

direct service of boats will land weekly shipments of fruit at Liverpool, or Manchester, Glasgow, Hull or Bristol, the position would be different, and a considerable benefit might be gained over London in supplying the Northern and Midland counties.

SOUTHAMPTON.

Before leaving the question of concentrating supplies, I must refer to the work done in the past at Southampton. Certain lots have been detached at that port.

In cases where the Southampton agents have secured regular customers and they can rely on them disposing of weekly orders, then it is probably advantageous to take off some portion of the fruit at that place, and in a few instances the fruit may be delivered at the destination quicker than if sent *via* London.

My experience, however, has been, that in the case of big lots detached at Southampton, they are consigned to salesmen in the Midlands and the North who are also the clients of London salesmen. This leads to confusion. In some cases too the fruit is despatched *via* London. This is simply duplicating the work and expenses.

In my opinion, where Southampton might prove of more importance is in opening up and pushing the fruit in the West and South of England in towns and seaside resorts where the fruit has hitherto not been planted in any quantities.

As the fruit trade from South Africa increases and special rates and a quicker through goods service are in operation from Southampton to the populous centres of the Midlands and the North, it will probably be found possible to do more distributing from that place.

In that event, it would have to be decided whether any advance in price compensates for the additional charges incurred as against London distribution—such as agents' expenses at Southampton, the extra cost of railage, and in some instances a higher ratio of market and sale charges.

Under the present conditions I do not favour the handling of bulk consignments at Southampton, and last year the want of a good through train service, together with the extra cost of railage, prevented me using the place as a distributing centre for the big provincial towns.

CONSIGNING DIRECT TO SALESMEN OR THROUGH GENERAL AGENTS.

Given a broker in whom complete reliance can be placed, and especially one who has had experience in the sale of fruit from South Africa, the employment of the "middle man" or general agent is not so necessary as, in the past, has been supposed.

At the same time the value of his services is not to be denied, especially in handling big consignments. He can regulate the quantities to be placed on the market at one time. If necessary, he can arrange for the fruit to be held in cool store for better prices, or distribute it to other markets. He can, if he thinks it to the interests of shippers, change his salesmen or auctioneers.

He is also useful in ordering and shipping to the Colonies the packing materials required.

In many ways his offices can be turned to good advantage.

Where, however, the private salesman or auctioneer can be depended upon to do these things and has the interests of the shippers equally at heart, the latter will save money by shipping direct to them, unless the general agent can make arrangements whereby the total London expenses are the same or but little higher than would be charged to the shipper by the private salesman or auctioneer, and this I am desired by Messrs. Mitchell Cotts to say they are prepared to undertake.

FIRMS RECOMMENDED.

I do not think that amongst the number of excellent firms, senders would be better served than by the following:—

London.

Private Salesmen:

Messrs. T. J. Pourpart, Covent Garden, W.C.

Messrs. George Monro, Ltd., Covent Garden, W.C.

Auctioneers:

Messrs. Garcia, Jacobs & Co., Covent Garden, W.C.

Messrs. E. A. O'Kelly & Co., Covent Garden, W.C.

General Agents:

Messrs. Mitchell, Cotts & Co., 65, London Wall, E.C.

Notes:

The greater portion of the Government Agency fruit (as well as shipments from other senders) was placed in the hands of Messrs. T. J. Pourpart, who went to a great deal of trouble and expense in advertising and pushing the fruit. They can be thoroughly relied upon to consult the best interests of shippers, and I know no better salesmen.

When the auction was used Messrs Garcia, Jacobs' services were employed. They, too, have a wide experience of South African fruit, and they did their very best under the unusually difficult conditions that obtained last season.

Both firms have local representatives in Natal.

They have also good and reliable connections in all the principal town in Great Britain.

Messrs. Mitchell, Cotts & Co. gave me complete satisfaction, and have been most assiduous in their attention to the fruit export business. Having a house in Durban, the facilities they offer should also be an advantage to exporters.

I may say that another salesman in London, in addition to Messrs. T. J. Poupert and G. Monro, Ltd., of good experience and connections (especially with exotic fruits such as the foregoing) is Mr. Charles Kauffman, Central Avenue, Covent Garden.

(I wish it to be understood that my recommendations are simply based on my experience of *Natal* fruit. There are other good firms, besides the above, who have had the disposing of Cape and Transvaal fruit.—F. H.)

Messrs. Perkin & Adamson showed themselves capable agents, and have had good experience in the handling of South African fruit.

HAMBURG.

Ferdinand Kugelmann, 13, Neuenburg, acted as agent in Hamburg for the Government Agency fruit, and gave entire satisfaction. The prices he secured were very good compared with England, and his account sales were rendered with commendable promptness and clearness.

A good firm of auctioneers is August Stier, Hamburg, 8, Fruchthof, working in conjunction with Messrs. Gustaf. Schonfeld & Co., Kaiser Wiljelmstr, 47, general agents, Hamburg.

ANTWERP AND ROTTERDAM.

Messrs. B. & M. Spiers, of Antwerp and Rotterdam (trading in Rotterdam and Amsterdam in the name of the Netherlands South African Fruit Company, Leuvenhaven, 38, Rotterdam), sold on our account. This firm gave a lot of attention to the business, and did the best possible under adverse circumstances of bad condition of fruit and trade.

PARIS.

A very good firm is Messrs. Omer Decugis et Fils, 57, Rue Saint Denis, Paris, and also M. Hollier, 13, Boulevard Rochechouart, Paris.

LONDON, PROVINCIAL, AND CONTINENTAL EXPENSES.

London.—I may say for general information, that, as the result of two years' experience, the total London expenses payable on Natal fruit should not, under ordinary circumstances, exceed, approximately, 10 per cent. of sales. If the prices are good and wastage very small they may be a little less. If the prices are low and condition of fruit bad they may be a little more.

The usual selling commission is $7\frac{1}{2}$ per cent., and the cost of cartage, market toll, portorage, etc., about $2\frac{1}{2}$ per cent.

If much re-packing has to be done that would be an "extra."

Provinces.—Distribution was made to Liverpool, Manchester, Cardiff, Bristol, Plymouth, Birmingham, Nottingham, Edinburgh, Glasgow, Dublin, and Belfast.

The total expenses incurred in distributing to towns in England during an ordinary season may be taken as between 15 per cent. to 20 per cent. of sales, according to distance from point of distribution.

They were somewhat higher last year owing to the waste and poor prices realised.

In *Ireland and Scotland* the expenses should not be more than 20 to 22 per cent. of sales.

Continent.—The expenses in shipping to the Continent are many, but to *Hamburg* last season they averaged about 25 per cent. to 27 per cent. of sales.

To *Antwerp, Rotterdam, and Amsterdam* about the same.

To *Paris*, taking into account the heavy import duty, the expenses may be taken at 45 to 50 per cent. Unless very high prices can be realised the charges are prohibitive.

CONTINENTAL MARKETS.

Hamburg.—I am of opinion that this market, which serves a very wide area on the Continent of Europe, including Russia, will become a very important one. Only the best quality fruit must be sent, and in good condition.

400 Small trays of naartjes per week should be easily absorbed.

There is also a free sale for oranges at good prices.

Rotterdam and Amsterdam offer increasing prospects for disposal of, say, 200 small trays per week.

Oranges in good demand.

Antwerp should also account for limited quantities at satisfactory prices.

Paris.—This market is doubtful. For the choicest naartjes and oranges in small quantities a market may be found, but the heavy expenses are a very severe handicap.

Last year the fruit for:—

Hamburg was shipped *via* Grimsby (Great Central Railway and Boats);

Rotterdam was shipped *via* London (Batavier Line);

Antwerp was shipped *via* Harwick (Great Eastern Railway and Boats);

Paris was shipped *via* Southampton and Harve (London and South-Western Railway and Boats).

An alternative and quicker service is now available to Hamburg, Amsterdam, Rotterdam, and Antwerp by the Great Central Railway

direct from Southampton to Grimsby, but the fruit would require to be loaded up in time to be despatched by the 9.8 a.m. passenger train from the Docks Station to catch the Saturday night's boat.

This would land the fruit on the Continental markets for sale on Monday morning. The cost would be somewhat higher on account of passenger service being used.

In the case of Hamburg, it would be an advantage, but it would be necessary for shippers to mark the packages "For Hamburg Direct," and have them stowed separately from the other fruit, so that they can be worked out of the ship first, and be carted at once to the Southampton Docks Station. Similarly for the Amsterdam, Rotterdam and Antwerp consignments.

OTHER MARKETS.

Canada.—The transshipping expenses impose restrictions on our developing much of a trade in Citrus fruits. The experiments with two small lots of oranges last year were not successful.

The only hope we have is when the Californian late Valencia orange crop is a poor one. I have the matter in hand with a firm of fruit-brokers in Montreal, and they have arranged to advise me should there be a chance of payable prices being realised.

It is estimated that at favourable times Natal oranges would fetch 12s. 6d. to 15s. a case of 150 to 200 fruits. This would pay.

Our naartjes were not sufficiently sound to have a fair trial made last year, but I hope to be enabled to do so during the coming season.

New York.—The small experiments made in the past do not afford encouragement.

The arrangements recently made at Southampton to secure the quicker transit of Cape fruit may ease the difficulties previously experienced, but I cannot speak hopefully until they have been given a fair trial.

With big supplies of Californian fruit available at the same time, and the heavy expenses of getting our fruit on the American market, it is a stiff proposition.

FRUIT DIRECT FROM THE FARM TO THE CONSUMER.

This is impracticable on any big scale as affecting South African fruit, except by means of a similar organisation to that of Elders Fyffes, who control the three essential departments of the industry—Production, Transport, and Distribution.

Therefore, until such a combination be brought about—a problematical question—the distribution must continue to be effected through the ordinary channels.

There is, however, nothing to prevent growers or firms in Natal soliciting orders through their Home representatives from the private consumer here, and placing a tray at his door every week throughout the season at an inclusive charge. It will be an extremely valuable means too of getting the fruit known throughout the country.

An extensive and profitable business might be done in this direction by an enterprising firm in the Colony whose representatives here would work in conjunction with a Parcels Delivery Company.

It is done from Canada, and Pickfords (Colonial) Agency, with whom I have been in communication, have been successful in carrying out the idea with Cape fruit.

Pickfords quote the following charges for free delivery from Nine Elms or East India Docks:—

Single (small) trays up to 6 lbs., 4d. in London; anywhere in the country, 9d.

Five (small) trays, tied together, up to 30 lbs., in London, 8d.; anywhere in the country, 2s.

NOTES.—These rates include cards and addressing. When sufficient to be shipped separately bill of lading, with list of addresses, should be made out.

COOL STORES IN FRUIT-GROWING DISTRICTS.

I draw attention to the action of the Victoria Government in authorising the expenditure of £10,000 for establishing cool stores at four different centres in the fruit-growing districts in order to make possible the marketing of the products at a time when it would be most profitable to the producers.

ADVERTISING.

A really big effort should be made to advertise Natal fruit. It would be money well spent. Growers might combine to place a large number of trays in the hands of the principal hotels, caterers, and amongst retail fruiterers throughout the country, with particulars of where the naartjes can be obtained.

Neatly printed cards extolling the virtues and exceptionally fine flavour of the mandarine should be inserted in the trays and boxes, something on the lines of the following testimonial I have received:—

NATAL NAARTJES.

The Superb South African Mandarine.

Read what an Authority says :—

"The Natal Naartje combines the advantages of the best kind of Tangerine with the juicy character of the Californian Orange, and is cleaner and nicer to handle than either of them."

EVERY FRUITERER SHOULD HAVE THEM.

ARRIVALS EACH MONDAY MORNING AT

COVENT GARDEN UP TO SEPTEMBER.

I should also like to see striking bills in every fruiterer's shop.

Attractive advertisements should be put in all the fruit papers and big dailies.

Where I suggest the Government might immediately assist is in voting money for illustrated lectures.

I have repeatedly urged this. It is one of the finest mediums of advertising the Colony could have.

An exhibit, too, at the Royal Horticultural Hall would be most valuable.

South Africa is far, very far, behind other Colonies in the advertising of its products.

I may relate that when America introduced its cranberries here, the markets were flooded with boxes at about one-fifth the price they are fetching to-day.

I repeat, a serious effort is necessary to fasten on to the minds of the British public what products South Africa has got to offer them, when and where they can be got—not alone fruit, but other consumables, etc.

The Governments should spend thousands, not hundreds, of pounds. It will come back in future years.

ORANGETTES.

This was the name given to the yellow mandarine.

To start with it obtained great favour, but after a time the interest declined.

Many, however, still prefer it to the naartje, as being sweeter and less pithy.

I suggest that the name "Orangette" be abandoned, and that it be shipped in the future simply as a "Mandarine" in smaller trays and boxes.

ORANGES.

Lessons from the Past.

Altogether (roundly) 2,400 cases of oranges were exported through the Government Agency in 1909. It was well that a greater number was not sent, for not a single box arrived sound in ventilated hold, and only a very few of those sent in cool chamber could be sold without re-packing.

For weeks together the Sanitary Inspector at Southampton stepped in and condemned a lot of the fruit. The condition was so bad that he would have been justified on occasions in having almost every case destroyed, but he very courteously consented to my having what good oranges there were rescued from the cases before being sent on to London.

The principal offender was the Coast orange, but the Midland and Up-country orange broke down also.

Information and advice concerning the severe wastage was furnished at the time by cable and report.

The oranges from the Sister Colonies (particularly the Cape) and other private senders in Natal also suffered.

The best-conditioned oranges on the whole season were undoubtedly those from the Rustenburg district of the Transvaal, although some wastage occurred.

This is a very good "carrier"; the packing, too, was uniformly commendable.

One standard-sized box was used.

The shipments presented a generally excellent appearance in direct contrast to the shipments from another Colony, where I noticed old soap-boxes and crates with coarse packing, more suited to the conveyance of saucapans than oranges, being used.

In another case the sender had experimented with a "preservative"—a kind of red sawdust or corkdust. It was so "effective" that half the oranges were rotten when opened on the market.

The standardisation of packages and methods throughout South Africa is badly needed.

A large number of Natal oranges were patchy and dirty. These should never be shipped. Some of the "Navels" were hard to tell, the "Navel" being so diminutive—they had to be sold as ordinary oranges.

The navel must be clearly in evidence to show to the buyer's satisfaction that the orange is a seedless one.

Ordinary and Navel oranges should not be packed in the same case.

FOR NEXT SEASON.

THE COAST ORANGE.

When climatic conditions similar to those last year precede the export season, unless there is reason to believe that local treatment has strengthened the fruit, I cannot recommend the shipment of Coast oranges.

Fewer handlings, had the fruit been packed on the farms, might have lessened the wastage, but it was very obvious from the mouldy mess which arrived at Southampton, that the fruit was much too weak to stand the journey in ventilated hold, and even that experimented with in cool chamber, though naturally not so wasty as the other fruit, yet when exposed for sale it rapidly broke down.

ORANGES FROM THE UPPER DISTRICTS.

The Midland and Up-country oranges, as I have previously remarked, carried better than the Coast.

THE NAVEL ORANGE.

In regard to the Navel orange, satisfactory prices can always be relied upon for these; that it might pay, in case of the ventilated hold proving unsuitable, to consign them in cool chamber.

GENERAL.

I am hoping that the general conditions for export next season will be much better, and that the Up-country oranges at least will travel satisfactorily.

But growers and exporters should proceed cautiously with small experimental lots before shipping bigger consignments, as a repetition of last season's bad arrivals would be exceedingly damaging to the reputation of Natal oranges.

METHODS OF CONVEYANCE.

The storage in ventilated hold last season was the best under the trying circumstances, but a temperature jumping from 55 degs. to 85 degs. imposed a terrific strain on the fruit. If only the temperature when passing through the tropics could be brought down by some means the resultant advantages to everyone concerned would be very great.

What we want is the medium between ventilated and cool chamber in temperature and freight.

FUTURE PROSPECTS AND PRICES.

That there is a big and broadening demand for South African oranges is positive. There is small competition, and as the season advances none; there is little to fear on that score.

Covent Garden is enthusiastic as to the prospects of the South African oranges, and advises much greater production.

The North of England and Scotland, which I hope to see served from northern ports at no far distant date, are also very good markets.

PRICES.

Prices will, of course, be affected by quantities, but, given sound condition, the export should prove a remunerative one to senders.

It is difficult to estimate future prices, but I think that for the small box of fine fruit (50 to 90) 4s. to 6s. should be obtained throughout the season, with a somewhat higher value for "Navels," and 8s. to 12s. per box of 150 to 200 fruits.

The season is good right up to November, then other countries begin to export in bulk.

The finest class of orange should be packed in small boxes to take 50 to 90 fruits, and the ordinary class in a larger box.

Exporters should be particular to see that only goods and clean stuff is forwarded, and that the recommendations as to picking, curing, packing and handling are strictly adhered to.

The further investigations will, I trust, result in improving the carrying qualities of the Natal orange, but, as it is proven that the fruit grown at higher altitudes is the best for export, the industry should be extended in the Midland and Upland districts.

The Washington Navel orange always commands good prices, and the more extensive cultivation of this variety should be undertaken.

OTHER FRUITS.

Experiments during the past season have been conducted with the undermentioned fruits:—

PINEAPPLES.

Various experiments were made through the Government Agency last year, upon which I reported fully at the time—April 2nd, 1909.

PACKAGE AND PACKING MATERIALS.

The uniformly correct packing of both Cayenne and Queen pines has yet to be accomplished. An improvement took place towards the end of the experiments, when mealie *cob* leaves were used.

This is unquestionably the best packing material, but the cob leaves must be well shredded, clean, as soft as possible, and, above all, *dry*.

In regard to the best box, it should not be too long or too narrow.

The Cape shipped three sizes, the middle one measuring (outside) $28\frac{1}{2} \times 13\frac{1}{2} \times 5\frac{1}{4}$ inches; three boxes in a bundle, only the top box lidded.

For the Cayenne pine, what is called the Azores "half case," a box 22 inches square and 9 inches deep is, I consider, the best package we

could adopt. Each of the pines (4 or 6) should be placed in a nest and be thickly and completely covered by the mealie trash to prevent bruising and obscure light.

For the Queen pine a box is recommended that will take 10 and 12 fruits, according to size, and allowing for plenty of packing, as stated in preceding paragraph.

The wood may be the commonest so long as it is strong enough.

The bundling of the boxes together, two without lids, gives the fruit a "cheap" appearance. For good class pines (and I urge the shipment of no other) the boxes should be shipped singly.

STOWAGE.

So long as the pines are shipped not too ripe, at such a stage as to allow for length of voyage and variation in temperatures, and the cases are stowed to the best advantage, I consider that ventilated hold will prove quite satisfactory for the Queen pine.

Further experiments are required to test the carrying properties of the Cayenne in the hold. From past experiments I doubt its efficacy.

The pines sent over last year in cool chamber soon lost their brightness after being exposed for sale. Those that may be sent in cool chamber in the future should never be shipped in any way green, because they will not colour afterwards. They will turn a greasy bronze hue and are then practically unsaleable.

Cool storage, of course, preserves the crowns bunchy, fresh and green, which means a much better price, but some means could, I suggest, be devised to prevent the crowns from shrivelling or becoming too discoloured in the hold, say, by wrapping them up in paper and burying the pine in the packing.

The wrapping round the crown would also prevent a pine bruising its neighbour, which it is important to guard against.

In regard to seasons of shipment from other countries, the following information may be of value:—

Florida.—This pine makes its appearance between May and August. Those on the market last year were similar to a small St. Michael, but very hard, being packed tightly together on top of one another. Prices 9d. to 1s. each in small quantities; lower prices afterwards.

Jamaica.—(Bull head variety.) Seasons and approximate prices:—(From January to early part of March, 3s. per dozen; 4s. in April; 2s. to 3s. per dozen from April to August. (Ripleys).—During March, 4s. to 7s. per dozen; April to end of June, 6s. per dozen; July, 5s. per dozen; and August, 4s. per dozen.

Azores.—This pine is our biggest competitor. The bulk is shipped

between October and May, when an average of 1,500 to 2,000 cases arrive every 10 days.

The prices run as under for pines in good condition:—Case of 12, 1s. to 2s. 3d.; average, 1s. 4d. to 1s. 6d. Case of 10, 1s. 3d. to 3s. 6d.; average, 2s. to 2s. 3d. Case of 8, 2s. 6d. to 4s. 6d.; average, 2s. 9d. to 3s. 6d.

The most suitable time for shipment to secure best prices would therefore appear to be from November to May.

SIZE OF NATAL QUEEN PINE.

I have persistently recommended that the Queen pine should not be shipped under about 2 lbs. in weight.

By proper cultivation such a pine, I am assured, can be produced in large quantities

The huge shipments last year of diminutive pines from the Cape did much to spoil the demand and to lower prices, and, with the unfortunate appearance later on in the season of "black heart," much damage was done to the reputation of South African pines generally.

The "black heart" did not affect Natal pines to any extent from our experience last year, but buyers nevertheless looked suspiciously upon every South African pine no matter where it came from.

Natal should make a speciality of its pines, especially the bright yellow Queen pine, calling it the "Golden Queen." It ought to strike a new note in pineapples for table decoration, and its flavour is unsurpassable. A cheaper pine for this purpose has long been demanded.

THE NATAL CAYENNE.

The appearance of the Natal Cayenne will have to be brought up to that of the St. Michael before it could compete successfully.

This may be secured in time and by following similar methods of cultivation to the Azores, under glass. Then the Natal flavour will quickly demonstrate its superiority.

A SUMMARY OF POINTS.

Summarising the chief *desiderata*, these are:—

A bright and even colour;

A fine crown, green and bunchy, but not "floppy" (double and treble crowns are not liked);

No "specks" or bruises (one little speck or bruise will depreciate the value considerably);

Perfectly clean (any dirt or sand should be removed before despatch);

Pines to be thickly covered by the packing material above recommended—shredded maize cob leaves;

Only the best fruit to be exported in two grades (No. 1 and No. 2);
Size of about 2 lbs. and over to be aimed at.

PRICES.

In not too large quantities to start with of the Queen pines, fulfilling the above requirements, prices ranging from 5d. to 7d. each should be secured.

As the pine establishes itself and competition becomes keener, a better price may be asked.

For big lots of the smaller Queen pine, averaging about 1 lb., I do not think more than 3d. to 4d. each could be relied upon.

We have to consider that the Cape is exporting largely at the same time, and, if that Colony exports the small pine in similar quantities to last year, I do not think that more than 2s. 6d. per dozen will be obtained on the average.

GENERAL REMARKS.

A strict eye should be kept on amateur experimentalists. Last year I received a consignment from a private source *with the crowns cut off* and both ends of the pine elaborately sealed with green wax. It was suggested that "high class grocers or confectioners" might like to take them. The costers obliged my salesman by taking them away at their own price.

Then another experiment was tried of dipping the fruit in "Formaline" before shipment. When the pines came out of the cool chamber they were covered with mildew.

Previous reports reflect my observations.

The sooner compulsory Government inspection is introduced the better.

The expenses of handling cases of pineapples in London are:—

Cartage at the rate of, approximately, 4s. per ton.

Market dues, 1d. per case of 12 Queen pines.

Commission, $7\frac{1}{2}$ per cent.

Say, 10 per cent. on sales

There should be a good demand for pines in Lancashire and the North. In that case, plus railage and extra charges, expenses may amount to 16 per cent. to 18 per cent.

The classification of pineapples has recently been revised by the Railway Clearing House. The rates to Manchester and Liverpool on South African pineapples are shown below:—

	Present Rate. Per Ton	Old Rate. Per Ton.
London to Manchester	45s. 2d.	53s. 11d.
London to Liverpool	39s. 4d.	52s. 6d.
Southampton to Manchester	52s. 6d.	63s. 2d.
Southampton to Liverpool	48s. 7d.	58s. 9d.

NOTE.—These rates include collection and delivery within prescribed cartage limits, except Liverpool.

AVOCADO PEARS.

Several small consignments were sent forward last year. The majority arrived in poor condition.

There is a limited demand for Avocado pears; they must arrive in sound condition.

The larger and greener the fruit the better the price, which, taking the year round, ranges from 6d. to 1s 3d. each. Big quantities would, of course, automatically depress prices.

Consignments received from Madeira are wrapped in tissue paper (this to prevent discolouration) and packed 30 to 50 fruits, according to size, in a box 30 in. x 9 in. x 4 in., divided in the middle, and having a little ventilation like our naatje boxes. Wood wool is the worst packing material that could be used; as it heats the fruit.

A little mealie cob trash to prevent bruising is all that is required.

CUSTARD APPLES.

There is a fair demand for these in the winter time. In summer they will not keep.

They must arrive green, packed similarly to Avocado pears.

Prices are about the same.

GRENADILLAS (PASSION FRUIT).

This is a difficult fruit to carry, even in cool chamber. The South African grenadilla is also too small for any big trade to be worked up. The market demands a larger fruit.

Further experiments might be tried later on, using soft mealie trash instead of wood wool in packing, each fruit wrapped in paper.

The tray used last year is suitable.

BRINGALS (EGG PLANT).

Those sent last year were much too large, though they carried in good condition. They were the wrong shape. What is required is one a little shorter than the ordinary cucumber and something of the same shape but straight.

There is always a limited demand for bringals.

FRENCH BEANS AND TOMATOES.

These were failures. Arrived in very bad condition. These are lines much too speculative and unremunerative to indulge in. They should be dropped.

CAPE GOOSEBERRIES.

These were not a success. There is no prospect of them being taken up for dessert and for jam-making; the price would probably not pay shippers. Should be shipped as pulp.

GREEN GINGER AND CHILLIES.

There is little prospect at Covert Garden for them, except during the pickling season, August and September, when there is a better demand for chillies.

The green variety is preferred, and the bigger the better for price. They might realise 1s. 6d. a 100.

PLUMS.

I have reported fully in regard to the "Methley" plum. If it can be grown larger it is assured a good market, especially if it be received here a week before Christmas, and in regular consignments afterwards.

PRESERVING, GLACAGE AND CRYSTALISING OF FRUITS.

Considering the exquisite flavour of most of Natal's fruits, there would appear to be an excellent opening for the establishment of factories to work the surplus fruit of the Colony.

It will, however, doubtless be more profitable to first cater for the local and South African markets, and with adequate protection against outside competition there would appear to be the promise of a flourishing industry.

I have, at the request of the Minister for Agriculture, collected and forwarded to the Colony an amount of data, plans, and estimates for a canning and preserving factory.

The best prospect, so far as the export trade is concerned, is in putting on the market a fine flavoured pineapple in tins, either whole, in chunks, or in cubes. As a guide to the wholesale prices of other foreign preserved fruits with which we should have to compete, I give *Appendix "A."*

There is, in my opinion, also a great opportunity for doing business in the passion fruit shipped over here in pulp, and put up in tasty jars or tins with proper instructions how to prepare it for dessert. Its deliciousness would establish it in the long run, and an authoritative contradiction should overcome the initial prejudice against the pips as aids to appendicitis, which would be sure to be advanced.

Then the utilisation of the surplus naartjes by preparing the slices glazed or crystalised has all the elements of success.

There is an extensive market for crystalised fruits, and the superior flavour of our naartje should soon create a big demand for it.

Information regarding methods employed in these processes has already been supplied.

Attention is also called to the possibilities of dried bananas as an exportable commodity. See *British South African Export Gazette* for February, 1910. I am getting together particulars.

The Appendices to this report which may prove of interest and use are:—

"A." Messrs. C. & E. Morton's Wholesale Prices of Foreign and English Pressed Fruits.

"B." Statement of Natal Fruit in Cool Chamber, Ventilated Hold, and on Deck. January to October, 1909.

I trust that the information contained in this report will be found of some value, and I desire to say that, in the same way as I have tried to exercise a vigilance and usefulness in connection with the fruit export in the past, and to furnish any serviceable data and advice, I shall during the time I remain in this position, continue to devote my energies to the end that complete success in the exportation of Natal fruits may be achieved.

FRANCIS HARRISON.

Commercial Agent.

Commercial Agent's Department,
Natal Government Agency,
London, February 3rd, 1910.

APPENDIX "A."

GOODS SHIPPED IN BOND, SAVING CUSTOM HOUSE DUTY.

C. & E. Morton remind their friends that they make no charge whatever for Custom House Clearing or Cartage, on Bonded Goods (goods packed in iron tanks excepted). No charge made for re-marking packages in bond for export.

Not Less than 1 cwt. of either kind of Currants, Raisins or Figs shipped in bond; smaller quantities supplied duty paid.

FOREIGN PRESERVED FRUITS.

Morton's Brand.

Cases free.				per doz.	
				s.	d.
Apricots in Syrup, Extra	...	...	24 No. 3 tins in a case	12	0
Bartlett Pears in Syrup, Extra ...	...	...	24 No. 3 " "	13	9
Peaches in Syrup, Extra	...	...	24 No. 3 " "	13	4½
Pine Apples, Whole	...	...	24 No. 2½ " "	6	0
Pine Apples, Chunks	...	...	24 No. 2½ " "	6	1½
Pine Apples, Cubes	...	...	24 No. 2½ " "	6	3

Original Brands.

Cases free.				per doz.
				s. d.
Apricots in Syrup, Extra	...	...	24 No. 3 tins in a case	11 6
Bartlett Pears in Syrup, Extra	...	...	24 No. 3 " "	13 3
Peaches in Syrup, Extra	...	...	24 No. 3 " "	12 10½
Pine Apples, Whole	...	...	36 No. 2 " "	4 6
" " " "	...	...	24 No. 2½ " "	5 7½
Pine Apples, Chunks	...	...	48 No. 1½ " "	3 9
" " " "	...	...	24 No. 2½ " "	5 9
Pine Apples, Cubes	...	...	48 No. 1½ " "	3 6
" " " "	...	...	24 No. 2½ " "	5 10½

Chas. Heaton & Co.'s Brand.

Cases free.				per doz.
				s. d.
Apricots in Syrup	...	...	24 No. 2½ tins in a case	7 4½
Bartlett Pears in Syrup	...	...	24 No. 2½ " "	8 10½
Peaches in Syrup	...	...	24 No. 2½ " "	8 4½

First Standard Brands.

Cases free.				per doz.
				s. d.
Apricots	...	...	24 No. 2½ tins in a case	6 9
Bartlett Pears	...	...	24 No. 2½ " "	8 3
Peaches	...	...	24 No. 2½ " "	7 9

Morton's Brand will be supplied unless otherwise ordered.

IMPERIAL FRENCH PLUMS.

Wm. Clark & Co.'s.

Guaranteed Fine Selected French Fruit. Wood-hooped cases, bottles and tins free.

Imperial French Plums—extra superior—65's—Season 1909—

				s. d.
				per cwt.
In original cases, each	14	4 lb. bottles	...	69 0
" "	28	2 lb. "	...	77 0
" "	12	2 lb. "	...	79 0
" "	56	1 lb. "	...	92 0
" "	24	1 lb. "	...	94 0
" "	12	10 lb. tins	...	60 0
" "	20	5 lb. "	...	64 0
" "	36	2 lb. "	...	70 0

If taken f.o.b. Bordeaux, 3s. per cwt. off above prices.

FRENCH PLUMS.

Cases and tins free.

French Plums—63's to 68's—Season 1909.

In cases containing	8	14 lb. tins	...	per cwt.	45 0
" "	16	7 lb. "	...	"	47 6
French Plums—63's to 68's—Season 1909—					
In original boxes of about	28	lbs.	...	"	40 0

DRIED APRICOTS.

Dried Apricots Season 1909—

In original Boxes, each about	25	lb. Boxes free	...	"	66 0
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CURRANTS.

4 lb., 7 lb. and 14 lb. tins extra.
Fine Bold Provincial—Season 1909—

In original hooped quarter-cases about 45 lb.	...	per cwt.	20	6
Repacked in 1 cwt. tin-lined cases...	...	"	20	9
" 4 lb., 7 lb. and 14 lb. soldered tins	...	"	21	6
Fine Patras—Season 1909—				
In original hooped quarter-cases about 45 lbs.	...	per cwt.	22	6
Repacked in 1 cwt. tin-lined cases...	...	"	22	9
" 4 lb., 7 lb. and 14 lb. soldered tins	...	"	23	6
Cases each 24 imperial quart stoppered bottles	...	per doz. bottles	7	6
" 112 1 lb. tins...	...	per doz. tins	4	3
" 56 2 lb. "...	...	"	7	3
" 100 1 lb. cartons, cases free	...	per case	27	0
" 50 2 lb. " "	...	"	26	3
" 100 ½ kilo " "	...	"	29	6
" 50 1 kilo " "	...	"	27	9

Fine Vostizza—Season 1909—

In original hooped quarter cases, about 50 lb.	...	per cwt.	30	0
Cases each 100 1 lb. cartons, cases free	...	per case	33	10½

Orders for Currants in original packages, or repacked into tins or tin-lined cases, will be supplied with Patras Fruit unless another kind is specified.

RAISINS.

4 lb., 7 lb. and 14 lb. tins extra.

Muscatel Raisins—Clusters—Season 1909—

Original boxes—plain, about 22 lb. net	...	per cwt.	65	0
" trays— " 6 lb. "	...	"	65	0
Cases each 24 imperial quart stoppered bottles	...	per doz. bottles	16	3

Sultana Raisins—Fine—Season 1909—

In original boxes, about 28 lb.	...	per cwt.	18	0
Repacked in 4 lb., 7 lb. and 14 lb. soldered tins	...	"	19	0

Sultana Raisins—Extra Fine—Season 1909—

In original boxes, about 28 lb.	...	"	22	0
Repacked in 4 lb., 7 lb. and 14 lb. soldered tins	...	"	23	0
Cases each 24 imperial quart stoppered bottles	...	per doz. bottles	7	9
" 112 1 lb. tins	...	per doz. tins	4	1½
" 56 2 lb. tins	...	"	7	0
" 100 1 lb. cartons, cases free	...	per case	26	9
" 50 2 lb. " "	...	"	26	0

Valencia Raisins—Selected—Season 1909—

In original 28 lb. boxes	...	per cwt.	20	6
Repacked in 4 lb., 7 lb. and 14 lb. soldered tins	...	"	21	6
Cases each 24 imperial quart stoppered bottles	...	per doz. bottles	7	4½

ALMONDS AND MUSCATEL RAISINS.

Season 1909.

Cases each 24 imperial quart stoppered bottles	...	per doz. bottles	19	0
" 28 4 lb. fancy cartons, cases free	...	per case	91	3
" 56 2 lb. " "	...	"	91	3
" 112 1 lb. " "	...	"	95	9

FIGS.

Eleme Figs in layers—Extra Fine—Season 1909—In original skeleton cases. Cases free.

Cases containing abt. 144 original boxes designated 2 lb.	...	per cwt.	40	0
" " 400 " " 1 lb.	...	"	43	6

Re-packed. Cases extra.

In cases of 50 original boxes designated 2 lb.	...	"	41	0
" 100 " " 2 lb.	...	"	41	0
" 75 " " 1 lb.	...	"	44	6
" 150 " " 1 lb.	...	"	44	6
Cases each 24 patent stoppered glass jars, each 1½ lb. net	...	per doz. jars	10	6
Preserved Eleme Figs, 1 lb. round tins	...	per doz.	8	0
" 2 lb. " "	...	"	8	0



METHLEY PLUMS. (*Field Sketch*).

(*See Article by Mr. C. Fuller*).

APPENDIX "B."

COPY OF STATEMENT KINDLY FURNISHED BY THE UNION CASTLE
S.S. CO.

Number of Packages of Natal Fruit in Cool Chamber, Hold, or on Deck.

Arrived January to May, 1909.

Cool Chamber.			Hold.			Total.
Pines	...	634	Pines	...	130	
Pears	...	13				
Grenadillas	...	7				
Passion Fruit	...	7				
Beans	...	1				
Fruit	...	68				
		730			130	860

Arrived May 15th to 13th October, 1909.

	Cool Chamber.	Ventilated Hold.	On Deck.	Total.
Pines	314	11	...	
Oranges	724	1,752	289	
Pears	20	...	...
Orangettes	44	...	...
Naartjes	8,919	223	...	
Citrus Fruit	360	...	...
Mandarines	38	...	...
Tomatoes	4	...	...
Gooseberries	4	...	...
Potatoes	...	1	...	
Fruit	345	12	17	
	10,772	1,999	306	13,077

Total No. of Packages 13,937

NOTE.—A "package" contained 2 or 3 boxes of Oranges, Naartjes and Pines bundled together, and 5 trays of Naartjees, Mandarines, etc.

Commercial Agent's Department,
Natal Government Agency, London.
3rd February, 1910.

APPENDIX "C."

FRESH FRUIT FROM NATAL.

Statement of Estimated Costs incurred in Placing and Selling Fresh Fruit on the London Market.

NOTE :—Cost of Fruit not included.

	Naartjes.			Oranges.	Pine-apples.
	Per Box (130-180).	Trays (24-36).	1 ft. sq. Smalltrays (18-20).	Boxes (130-200).	Boxes (10-12).
Cost of Boxes or trays in Durban ...	d.	d.	d.	d.	d.
Cost of sizing, grading and packing ...	4	2½	1½	9	6
Cost of wrappers, woodwool or paper shavings and nails ...	3	1	¾	3	2
Railage to Point ...	2½	1½	1	3	2
Freight and all Shipping Charges. Cool Chamber	1½	½	¼	5	1½
	19	6	4	38	28
Ventilated Hold ...	8½	2¾	1¾	17	12
London Expenses, including cartage, handling, market tolls and salesman's commission (10 per cent. on average sales) ...	6	2	1½	8	5 c.c. †4 v.h.
TOTAL CHARGES :—					
Cool Chamber ...	36	13½	*9	66	44½
Ventilated Hold ...	25½	10	6¾	45	27½

† The price of pineapples would be less per dozen *ex* ventilated hold than cool chamber, if the crown is not firm, bunched and perfectly green, and the fruit quite bright and clean.

* A smaller tray, say 9 in. x 9 in. x 2½ in. should not cost more than 5d. total expenses (Cool Chamber).

FRANCIS HARRISON,
Commercial Agent.

Natal Government Agency, London.
3rd February, 1910.

Always keep plenty of clean, fresh water in the poultry runs. Eggs are made up largely of liquid matter. Hens shut away from water or getting water at odd times show signs of their disapproval by restricting their output of eggs.

The Methley Plum and its Export.

By CLAUDE FULLER.

THE Methley Plum is nowadays very generally known throughout the Colony, and, considering what a short time has elapsed since its discovery, may be said to be quite widely planted. Naturally sufficient time has not elapsed to draw any conclusions as to the adaptability of the variety to the varying conditions under which it is being cultivated, but it can be said that it flourishes in the district of Balgowan, where it made its first appearance.

New varieties of fruits are so much the order nowadays that the advent of this variety has been taken very much as a matter of course. Locally, however, it is something remarkably unusual, and the importance of the event lies not with the value of the fruit, but rather in the lesson it should convey to our fruit culturists and horticulturists as to the opportunities before them in developing new local strains. *

Whilst it is quite true that successful fruit culture lies in attending to a few varieties, and that the intending fruit-grower has far too many varieties to choose from and chooses far too many in setting out his orchard, it is equally true that we are still very much at sea as to what varieties are most suitable to local conditions; and, further far than this, it is true that for real suitability to local conditions and immunity from physiological troubles arising from the vagaries of these conditions varieties of local origin will in the long run be our chief reliance.

It must be some five years now since Mr. Willoughby Methley first submitted this fruit to my notice, and I must confess that for the moment I regarded it as a small form of the well-known "Satsuma" until its early ripening proclivity appealed to me.

The "Methley" originated near Mr. Methley's homestead, the original tree being a volunteer and growing near a spruit hard by. This seedling, to-day the parent of thousands growing throughout the Colony, attracted attention directly it first fruited owing to the earliness with which the plums ripened—that is, at the same time as our local Myrobalan,* possibly the "Marianna" and frequently but erroneously called the "Mira-belle."

The virtue of the "Methley" is its early ripening. It possesses the good characters of the "Satsuma," but is deficient in point of size.

There is every reason to believe that the plum originated from the fertilising of "Satsuma" flowers by Myrobalan pollen, the male element

* Myrobalan is used throughout as a group name.

transmitting the smaller size and earliness of ripening and not impairing with Myrobalan faults the flavour and texture of the "Satsuma."

From enquiries it seems that some blood plums were sent to Mr. Methley from another farm from trees growing in juxtaposition to Myrobalans. After this lot of fruit had been partaken of the stones were thrown out. From one of these pits washed down towards the sluic by the weather it is assumed the original "Methley" grew. As no other adventitious plums came into being, it is rather interesting to speculate upon this one survival, which may, of course, have been the only cross pollenized seed of the lot.

DESCRIPTION.

Methley.—Probably first cross, Myrobalan x Satsuma. Myrobalan probably Mirianna. Originated Methley's farm, Balgowan, Natal, by accident.

Fruit, broadly oval, never quite so conical as Satsuma; size, medium, $1\frac{1}{2}$ inches high, usually about 1-10th inch longer than broad; cavity, medium deep, rounded; stem short, 1-5th to 3-10th inches, yellow, but brown where attached to fruit and stem; suture, nearly obsolete; apex, bluntly pointed; colour, dark red, ripening to darker red; dots, numerous; russet, areolar; bloom, whitish or bluish; flesh, dark red, firm; stone, medium, 7-10th x 6-10th inch, cling; flavour and quality good; season very early; thrives on peach stock.

EXPORT.

Through the courtesy of Mr. Willoughby Methley, I was enabled to send a small parcel to London early last December. These were by no means the first of the crop, and a picking could have been made at least a fortnight earlier.

The parcel comprised sixteen trays. Four of these measured 24 in. x 12 in. x $2\frac{1}{2}$ in., the remaining twelve being 12 in. x 12 in. x $2\frac{1}{2}$ in.

The four large trays were sent as packed upon the farm. The fruit was not wrapped. Two trays were packed by myself and two by Natives. One large tray realised 8s. gross, and the remaining three, which were "broken for samples," fetched 5s. each.

The twelve small trays were packed upon the usual principles, but in some the fruit was wrapped and in others unwrapped. In some wood-wool was used for packing and in others paper shavings. In some the fruit was packed close together and in others a wad of paper shavings separated each row. The average pack was fifty fruits to the tray, and the trays realised 4s. each gross, or practically one penny per fruit.

THE COMMERCIAL AGENT'S REPORT.

1. The consignment arrived on the 25th December, but owing to the Christmas holidays they could not be offered for sale before the 29th.

2. They arrived in excellent condition, but a good number of the plums packed loosely and roughly in coarse wood-wool (by Natives) had split and were bruised. Some had developed a white mould at the sore. [This damage occurred undoubtedly between the farm and steamship.—C.F.]

3. The plums packed in the small trays, each separately wrapped, carried the best, but there were a few split and bruised. [Due to being over-ripe.—C.F.]

4. The size of the single tray is liked. The large box with partition (24 in. x 12 in. x $2\frac{1}{2}$ in.) is not recommended. The small trays should be crated in tens. Soft wood-wool should be used as a buffer at the bottom of the tray. Each plum should be wrapped in tissue paper. Paper shavings would do equally well. Pack, say, thirty to the tray. [A thirty pack would mean a larger plum.—C.F.]

5. As I was able to get a better opinion from high-class fruiterers by placing these "Methley plums with T. J. Poupart, both as regards acceptability from a flavour standpoint as well as price. I did not put any up at the auction.

The auction does not give the true value of a new article in small quantities, because if it is good there is violent competition and ridiculously high prices, and if poor it is sacrificed for anything it will fetch.

6. The general opinion of Covent Garden, and the best fruiterers in London is that this "Methley" plum is a nice-flavoured fruit, but too small for dessert.

7. If it can be exported here twice the size, or, say, the size of a well-grown "Satsuma," it will command a good price; indeed, if the fruit in these few boxes had been larger I could have obtained 10s. a small tray quite easily, but, of course, this price would only rule at this festive season and in moderate quantities.

8 Endeavour should be made to land the fruit in London as early as possible before Christmas and keep up regular consignments.

9. When the "Methley" is shipped of larger size there should be a very good demand for it at a payable price, for it is a delicious eating plum

(Signed) FRANCIS HARRISON.

London, 31st December, 1909.

POUPART'S REPORT.

Under date of January 5th, 1910, Mr. T. J. Poupart reports as follows:--

"The large boxes were slightly wasty, but the small came to hand in a very good condition, and I hope the prices we have realised will give satisfaction.

"These plums would make fancy prices if they could be got here rather a larger size, but it is very difficult to induce the best fruiterers to take them, owing to their want of 'show.'"

The above reports call for very little comment or explanation. Packed in the small trays the fruits realised 8s. per 100 gross, against 4s. to 5s. 6d. per tray of 140 to 150 (the best local prices) obtained upon the Johannesburg market. About 192 of these trays go to the cubic ton. The estimated return may therefore be set out as follows:—

192 Trays (9,600 fruits) at 4s. per tray	...	...	...	£38 8 0
Less Freight, 1 ton at 70s....	...	...	3 10 0	
Primage, 10 per cent.	...	...	0 7 0	
Shipping	...	...	0 2 6	
Customs Duty	...	...	0 1 6	
192 trays at 2½d. each	...	...	2 0 0	
To packing at 1d. per tray	...	...	0 16 0	
Railage to Durban at 1d. per tray	...	...	0 16 0	
				7 13 0
				£30 15 0

The net profit of £30 15s. represents practically 6s. 5d. per 100 net to the grower, providing the price of 4s. per tray could be maintained.

With regard to the size of the plums forwarded, I am given to understand that larger fruits are grown, and I am quite sure the size can be increased by judicious thinning of the crop and attention to cultivation and manuring. If not there is some nice work in front of a clever horticulturist who, following the footsteps of the renowned Burbank, can increase the size without impairing the quality and earliness of this excellent little plum.

What the experiment brings out most clearly is the good carrying qualities of this fruit, and no one who will observe ordinary care in picking and packing need fail in placing a consignment upon the London market in a sound condition.

Don't feed a sow with young pigs very much rich slop; it might derange the pigs.

Don't let the hogs shift for themselves and then expect to reap large profits.

Well-bred fowls cost no more to keep than mongrels.

Hens that stop laying may be induced to continue their good work by a complete change of food.

Suggestions re Road and Motor Traction for Natal.

By J. F. E. BARNES, C.M.G., Chief Engineer, P.W.D.

ENCOURAGED by the favourable reception of, and the verbal and written enquiries I have received relative to my Notes on the International Road Conference, Paris, 1908, as printed in the November number of the *Agricultural Journal*, I venture to return to the subject and briefly emphasise those points which in my opinion are most worthy of attention and of following up.

I have by facts and figures shown how more than favourably Natal compares with other countries as regards the cost of road construction and maintenance.

I have sounded a note of warning to the effect that these favourable conditions cannot last for ever.

That while a considerable amount of improvement has been effected, much yet remains to be done if we are to get abreast of the times.

That transport by *ox-wagon* may be regarded as dead.

That the roads which fully satisfied ox-wagon requirements do not suffice for mules or for motors.

That although some 1,600 miles of gradients have been eased, many miles yet call for attention.

More important still, that although 500 miles have been *hardened*, yet that mileage represents but one-eleventh of the whole.

To harden *all* the roads would, as I have shown, cost at a low estimate, fully 2½ millions sterling, and would involve many years of work.

Fortunately, however, it is not necessary just at the present that all the roads should be hardened. But it is *most* essential that roads in particular districts should be improved and hardened.

Outlying places and districts distant from railways, if they are to advance, must have suitable means of bringing their produce to railway stations. To effect such improvements, within the means of Natal, requires that provision be made uninterruptedly from year to year by the granting of a reasonable sum annually, such sum to be especially "ear marked" for the permanent work of the improvement of roads.

The present Government has this session of Parliament initiated that policy.

Natalians should see to it that the policy is continued in the future.

The amount need not be large, £10,000 to at most £20,000 per annum will suffice. Indede, work of this kind, proceeded with on these

moderate lines, will not only meet requirements, but can be done at rates far more economical than if an attempt be made to "*rush*" it in a short period and on a large scale.

Farmers' Associations and Chambers of Commerce might help themselves and assist Government by enumerating those roads in their several districts which ought in their opinion to receive first attention in respect to gradients and hardening. It would naturally be an advantage if, at the same time, applications of the kind be accompanied by estimates of the numbers of farms which would benefit, the tonnage of produce which would travel over the roads, and the extent to which, as represented by *railway returns*, each such road would become a railway feeder.

From these applications Government and the Public Works Department could then select those claiming prior attention and "*ear mark*" them in the order in which they should be carried out under the Permanent Improvement Vote above referred to.

According as each road has thus been improved, but not until then, motor traffic may be established.

Practical men will, I think, readily admit that to attempt motor traction on roads until they have been so prepared is only to count failure and loss.

I have been asked why and to what extent I favour the Renard road train? My answer is that in the first place, regarding the matter from the Treasury and Public Works Department point of view, every care should be taken to encourage whatever system of transport will be the least injurious to the roads of the Colony.

The Road Conference of 1908 pronounced favourably on the Renard road train in this regard.

A moment's consideration will convince anyone that a Renard train, with its light locomotor, $3\frac{1}{2}$ tons, with three followers of 3 tons each, every wagon having three pairs of wheels, making a gross load of $27\frac{1}{2}$ tons on 22 wheels, or about $1\frac{1}{4}$ tons on each wheel, would be far less injurious to our roads than a traction engine of 12 tons, which can only draw a useful load of half its own weight, and which exerts a destructive pressure of 4 tons on each wheel.

But a greater advantage still is that the road train is both drawn and propelled on four pairs of wheels, two for the motor and two to each follower, while the traction engine has to depend entirely upon one pair of driving wheels.

The more equable distribution of the train load and its greater propelling power again renders it capable of crossing with safety bridges upon which a traction engine could not venture.

Mr. Head, District Engineer, Public Works, in charge of the Coast

district of Natal and of Zululand, who knows the requirements of the Colony, and the conditions under which motor traction must be conducted, personally attended the trial trip of a Renard road train built at the Daimler Works, Coventry, for the Queensland Government.

Mr. Head's verdict is that "given hard roads the Renard road train is just what Natal requires for the conveyance of produce in bulk, such as mealies and wattles, and for passengers and parcels."

He is satisfied that "the Renard road train has passed the experimental stage and that further delay in availing ourselves of this invention is but waste of time."

The Consulting Engineer to the Colony, Mr. Humby, tells us that during the past few years the construction of the mechanical parts of the locomotor has been greatly strengthened and improved, and that all working parts are now standardised.

Mr. Head has personally satisfied himself that the locomotor is easily capable of negotiating any of our improved gradients; that, in fact, it can take gradients much steeper than 1 in 10, as also that its "brake control" is efficient.

That, as a matter of fact, while running down a grade of 1 in 6 with three loaded cars carrying 15 tons of goods, the train inspected by him, when travelling at 12 miles an hour was brought to a standstill in a distance of less than *three* yards.

With these important items in its favour and the further fact that sharp curves, and even right angle bends, are no obstacle to it, as also that it has the minimum of injurious effect on the road surface, is there any room for asking why I favour the Renard road train?

In many instances such a system would in my opinion be more useful to an outlying district than would a narrow gauge railway. The road train could be established in half the time and for 1-8th to 1-10th of the cost of the narrow gauge.

The hardened and graded road (being a preliminary essential to the establishment of a road train) would in itself secure to the district an asset far more valuable to the ordinary farmer and traveller than any narrow gauge line. This is, of course, for reasonable distances, say for 20 to 40 miles. But, generally speaking, for £10,000 a district can by this means be opened up, which for narrow gauge railways would require an outlay of £80,000 to £100,000.

A road can be prepared in half the time it takes to build a railway.

And, finally, when through the aid of this smaller expenditure of time and money, the Renard road train has enabled a district to develop itself, and has thus performed the office of a pioneer, then, with much more advantage to such district and less expense to the Colony, a railway

can with greater confidence be constructed, and the road train be transferred to again act as a railway pioneer elsewhere.

Against the greater cost of the Renard train, it must be borne in mind that each locomotor can shift three times the load in half the time which would be occupied by a traction engine. This added to the fact that it can practically travel in all weathers renders it far more economical.

But it need hardly be pointed out that a Renard train is more suitable for the purposes of a large district or a syndicate than for those of a private person. In this respect it offers a ready means of useful co-operation by residents of districts or by farmers' associations.

CHURNING.—The first thing to do before churning is to see that the churn is thoroughly clean. Then give a good scalding with water about 150 degs. After drawing off the water, take the temperature of the churn, and of the cream, which in winter should be about 58 to 60 degs., and in summer 54 to 58 degs., for churning. Next, put a straining cloth over the mouth of the churn, and pour in the cream. Take off the cloth and put on the lid. Then commence to churn, slowly at first and thoroughly ventilate. After churning slowly about five minutes or a little longer, according to the amount of cream in the churn, turn quicker until you notice the sound change, then gradually churn slower. Sometimes the butter is a long time churning. This may be caused by the cream being too thick, the churn too full, or not being ventilated. The breaking water is added to reduce the temperature of the cream which rises during churning. It also improves the grain. By the way, the grain should be about the size of mustard seeds. It will spoil the butter if it is churned into lumps. After the butter has been churned enough, draw off the buttermilk and put in water for washing. Churn a few times, then draw off and add more water. Gently turn, then take out the butter, which is now ready for salting and making up. Well scrub the churn inside and out; then scald it and polish the outside; leave it turned upside down with lid taken off.—H. E. B., in *Agricultural Gazette* (London).

Big, coarse birds are invariably poor layers, and wherever size has been instilled egg production has fallen off. This is especially noticeable in the English breeds of Minorca and Leghorn, which were usually imported into Australasia, and the outlook would now be very bad if it had not been for the little egg machines procured from America.

The Living Bee.

By MARY RITCHIE,
*President, Natal Bee-Keepers' Association; Natal Expert, South
African Bee-Keepers' Association.*

(Continued from Page 150.)

XIX.—QUEENLESS.

THE summer night has come but brought no coolness. Many of the bees are sleeping on the alighting boards, partly on account of the heat and partly, probably, to guard their stores against robber bees. The hot, thunderous weather of the past few weeks has supplied the atmospheric conditions necessary for a good honey flow. The mangoes now weighted down with fruit have been laden with blossom, every shrub and tree around has flowered its best, and so the honey has come in and the bees hang outside, quietly resting after their labours.

We imagined the queen returning to her hive and all going happy as a marriage bell. The sun was at its zenith and the year at the noon. The sky was a perfect blue. "But sometimes on the brightest summer days a dark cloud steals across the blue. We follow its shadow on the hills, and as it blots out the sun from us for a few long seconds we feel a shiver of suspense." What if through some mischance our queen-bee fail to mate—what if some cruel bird pursue? "For this cloud is the external counter-oart of the tear that comes sometime to all of us, to blot out God's sun. Its shadow is death's. In the midst of all our summer joy he with the ever-harvesting sickle walks with swift feet. He touches the meadows with his skirts and the grass withereth, he breathes upon the dancing day-flies and they sink with the setting sun, he passes amid the flocks and many need no more shepherding." Our queen bee will never return.

What of the colony? How soon do they realise that all is lost? It depends on the size and nature of the colony; that a period of grief ensues no one can doubt who has ever listened to the wail of queenless bees. A very weak colony is doomed from the first. Instead of the hope and joyousness that should have been, there is misery and despair. The main-spring is broken. Fate is too strong for them, they yield, and drawing closer and closer in their misery literally wail themselves to death.

As a rule, however, bees are not immediately and by no means so easily overpowered. There is a time of confusion it is true when they hurry out and in, running ever to the entrance, eager for her return. At last hope dies away, their grief subsides. In the face of those staring,

empty, grubless cells it is imperative that somebody should do something. It must be remembered that under other conditions every worker might have been a queen. She can at least lay eggs and she does here, there, and everywhere. Eggs laid by fertile workers—as they are called—are often to be seen in queen-right colonies, but the bees evidently take no notice of them. But just as a drowning man will catch at a straw so with the bees. These eggs are carefully looked after and taken care of. Poor little bees—all this labour is futile and leads only to destruction, for the eggs being unfertilised hatch out drones—and drones alone mean death.

To prevent all this the bee-keeper, of course, may interfere, and by giving brood brought from another colony save the situation. But the task is no easy one. These fertile workers are tremendously proud of themselves. They possibly delude the others, and though the brood given is carefully tended no queen cells are begun. A laying queen may be given, but this also is a difficult task. The existence of fertile workers means the ruination of good comb so that the best plan is to unite the bees—as soon as queenlessness is discovered—with another colony.

Not only dwindling and death but something worse than death occurs, and the bee-keeper who has handled a colony that has perished in this way will not easily forget it. The drones are sometimes the same as those that buzz so noisily out and in the hive, but as often as not they are abnormal and quite creepy to look at. Reared in worker cells they are about the size of workers, tiny, pretending, would-be drones so utterly pitiful that one wonders how such things can exist.

We have considered colonies that wail themselves to death and others that will nurture drones to the bitter end to their own destruction. But fortunately the story does not end there. There are bees that however puzzled and hopeless at first will find a way out, and with almost human audacity set Fate at defiance. Circumstances are all against them, they are hopelessly queenless, there is no worker brood; but to them difficulty becomes an opportunity, and with a feeling that surely passes from instinct into intelligence they will *commandeer an egg from a queen-right colony from which to rear a queen*. It is only natural that when one knows for certain that such a thing has occurred, these bees become one's favourites in the apiary. The very wonder of it makes one pause.

We read of the sacred Scarabeans of the Egyptians, and any one who has watched a couple of dung beetles suffer defeat after defeat—crushing and overwhelming—and yet see them return again and again to the attack only more and more determined, can understand how they came to be venerated and used as charms in jewelled amulets and all the rest. Scotland's hopes once hung on a spider's web, the web of the famous spider that tried and tried again, and provided in the trying a lesson in

perseverance to every school boy since, and sometimes encouragement, in cases more forlorn than that of Bannockburn!

But what of the worker-bee that makes the whole world hers and when the colony is in the very blackest depths of despair, with marvellous insight—it is more than instinct—*thinks* of securing an egg from another hive and turns the empty, mirthless home to halls of plenty and rejoicing. We might figure her on our honey labels. We might do more. She might be stamped, with the happy queen and the gay-coloured drone, upon the very stamp and seal of the Association itself.

XX.—HOW BEES SHOULD BE MARKED.

Our headmistress—after her holiday experience—is an authority on stings. Our language-mistress knows all about queen-rearing. She has been studying for the past few months Herrn Kramer's "Rassenzucht" with a view to translating it for the Association, but the wonder and the mystery and the ways of these "Koneginnen," as she calls them, are quite beyond her. "Can it be possible that he says this? And does it really mean that?"

All it really means embraces the whole science and practice of queen-rearing—quite the M.A. and B.A. of bee-keeping, heights to be scaled at some future day. Meantime, as even the novice wishes to make experiments on the living bee with regard to times of flight, numbers of journeys, etc., the following hints on the marking of bees may be interesting.

How bees are to be marked. Take a piece of cardboard and cut a circular hole in it about four inches in diameter, or the tin rim of a glass-lidded jam-jar and cover the hole with a small piece of mosquito net. Make a quick-drying lacquer (sealing wax dissolved in methylated spirit) in four colours—white, yellow, red and blue, place in little glasses with a pointed stick or sticks to put it on with.

Secure the queen or bee to be marked under the soft thread net. This because it is next to impossible to mark her when she is running free, or at any rate difficult to do so without besmearing her wings and eyes.

If it is his first attempt in marking a queen the operator must not hurry, otherwise she will fly about and hurt herself. In all cases the beginner should start with the bees. The colour must not be too thick nor too thin, but the bee-keeper will soon determine for himself the right thickness and quantity to be used. It is a good plan to let the first drop fall on the table and then quickly drop the remainder on the bee to be marked. The colour should not be left in a little lump, but rubbed gently with a stick so that it covers the thorax.

As soon as she is marked the net should be lifted so that she does not rub off the colour. Now is the time to let the queen run into your

pipe-bowl, or let her walk about in a queen-cage in order that the colour may dry. (The translator explains here that the Germans use big, fat pipes; perhaps the South African bee-keeper had better run her direct into the queen-cage!—ED.) She must, continues our author, on no account be allowed to catch cold; the entrance stopped up with honey-dough, the cage should be put right into the nucleus-box.

If a laying queen it is not necessary to catch her. Fasten three long needles to the net like the tiny feet of a standing lens) and simply set it over the queen. She is then marked directly on the comb. The net is slightly raised, but held over her awhile that she may dry before being given her freedom.

A setting of eggs from a satisfactory source will start a good flock of birds.

The best way to rid the poultry yard of disease is to give the houses a good cleaning often and remove all diseased birds.

Leg weakness in fowl is often the result of a lack of mineral matter in the food. Give them ground bone in the mash and notice the improvement.

Some sows will bring up the pigs well for about two litters and then gradually get worse; while others will bring up eight or nine litters without any apparent depreciation in suckling qualities.

A common mistake, especially among farmers who undertake duck-raising as a side line on the farm, is, they endeavour to keep their chickens and ducks together. They are fed and housed in the same building, and sooner or later the ducks become very unhealthy, and in the course of a year or two die. Ducks and chickens are as different in their habits as sheep and pigs, and one might just as well endeavour to combine the latter two as the former.

The Toulouse is the largest and heaviest of all geese; the Embden is next in size. These two will produce from twenty-five to thirty eggs for hatching each season. The African, which comes next in size, cannot be depended on to produce much in excess of fifteen or twenty eggs during the season. The Chinese, the bantam of the goose family, lays many more eggs than either of these: they are smaller in size, more easily handled, and grow to quick maturity.

Hints from the Hive.

POINTS TO BE OBSERVED IN WORKING FOR COMB AND EXTRACTED HONEY.

By H. MARTIN, Dannhauser.

FOR anyone going in for more than one or two hives the question of which particular class of honey to work for has no doubt occupied the prospective bee-keeper's mind not a little, and very often it is a very hard one to decide. If only a couple of hives are kept the ever-ready one pound section is a very handy and attractive receptacle for honey, and if fairly well filled and light in colour, commands the highest price and the readiest sale of any method of putting honey on the market. It is also the least expensive method for the small bee-keeper.

But while the section has the above advantages among others not enumerated, it is very questionable if the extractor does not repay the extra cost in a very short time where, say, half-a-dozen or more hives are kept. Apart from the fact that very often the small apiarian is very much handicapped without an extractor, even with his couple of hives, there is a lot of work getting sections ready for the supers, and also when they are taken off the hives in getting them ready for market. It may be asked how anyone can be handicapped without an extractor if they work only on the comb honey principle, but to anyone who has kept bees for any length of time and gave any thought to their requirements the need will be obvious. How often do we find far more honey in the brood nest than there should be? In fact many times it would be a positive gain to the colony if the honey were anywhere else but there. Without an extractor it is impossible to get it away except the bee-keeper is wise enough to sacrifice the combs entirely and give fresh sheets of foundation, or even starters. Anything is better than that the honey should be crowding out the queen from laying in what should be her own legitimate domain. Such an occurrence often happens if we are not watching out for the honey flow and put on supers just when they are required.

I am digressing from my subject. Without wishing to advocate either method as being the better one, let us look at a few of the advantages and disadvantages of both. In comb honey, as already stated, we have an article which is always in greatest demand. A great many people have an in-born prejudice against honey in a jar or bottle. A prejudice which is more often than not based on a supposition that such

Honey is more easily adulterated than when in the comb. Yet, as a matter of fact, it is as easy to defraud with comb honey as it is with extracted, and there is much less danger of detection. On the other hand, if the jars are honestly filled the purchaser gets his full pound of honey when he buys it in the jar, whereas in comb honey there is a great variation in the weight and the wood of the section and the wax goes in with the weight. Another drawback to section honey is the necessity for care in the handling from the moment we start to take them off the hive till it has reached its destination at the depot, or the home of the consumer, must this care be sedulously kept up. At the very outset, if we remove our supers from the hive without a "clearer," we have got to hustle round to get the bees off quickly before they commence uncapping and removing the honey, a proceeding which very often does a lot of harm. Again, when we get them into the house we have to use care in scraping and getting our sections presentable, even if we do not glaze them, which I think is always worth the trouble if they have to travel far and are expected to command the highest price. Glazing also disposes of the trouble from ants, which are such a nuisance to the bee-keeper both at the hives and also when the honey is stored away. But apart from the many little troubles and inconveniences we have to surmount in working for comb honey there can be no doubt at all of the genuine satisfaction it gives one to produce a really fine article. No matter how well honey may be got up or appear in glass jars, the pleasure it gives is very tame compared to the enjoyment of beholding a row of clean sections with their beautiful white virgin comb. Here we have not only the delicious nectar turned into honey, but also we behold the wonderful workmanship of these most wonderful little insects in its highest form of perfection.

So far we have not touched on the most important points of all in deciding between comb *versus* extracted honey. These I look upon as locality and bees themselves. Now, I fancy I can hear someone saying, "Why, what has either got to do with making the choice? Are not all bees alike under similar conditions? Any why should locality make any difference in the honey whether we want it stored in sections or in extracting supers? But there is a very great difference both in the bees and also in the locality. Let us see what locality can have to do in the matter. Well, we know in some parts at particular seasons of the year we have a profuse bloom of honey-bearing plants which are entirely absent in others; now to produce a really fine article of comb honey it is essential that it should be stored very rapidly and removed as soon as sealed, and this can only take place in a locality which, in bee parlance, has a "flow" season. On the other hand, if we are in a locality which has a sparse bloom of nectar plants, or where the honey is stored slowly and steadily for a long



ROAD TRACTION.—I.

One of the two mixed trains in India Capacity : 15 tons of goods and 25 passengers.

(See Article by Mr. J. E. Barnes.)

period, we can never hope to make a success of comb honey, because we are obliged to let the super stay on the hive till it gets travel-staided, as it is called, and the appearance of the comb suffers thereby. With extracted honey the case is different, as it is the flavour and appearance of the liquid in the jar we depend on to command its sale, and the longer it remains on the hive the finer the flavour becomes. From this point of view it will be seen how much the locality has to do with honey production, not only from the standpoint of quantity but also as to the best kind of produce.

Sometimes we can compromise matters and get both comb and extracted honey in the one district if we are so minded. In the northern parts of Natal at any rate we have no flow to speak of until the last week of January, which is synonymous with the bloom of the mealie flower. Yet some seasons and in some parts a quantity of honey is brought in long before this, which, if stored in extracting frames, is of fair quality, but totally "off" in sections from the reasons given previously. With a super of extracting frames on we get all this honey stored in a desirable form, and not only that but it helps to check swarming. Then when the flow comes on a crate of sections is nearly always sure to be readily accepted by the bees if placed below the extracting frames. Later on, when this flow eases off we can, if honey is still coming in, go back to the extracting frames. That is if the bee-keeper is desirous of getting the best of comb honey and also getting the best out of his bees. For my own part I find the extracted the most satisfactory all the time.

Let us now look at the part the bees themselves play in the production of comb honey. That all bees (that is all belonging to the species *Mellifica*) store honey in comb is an accepted fact, but all do not store it, or do not cap it, in the same manner. There are at least, roughly and broadly speaking, three distinct kinds of cappings on the combs. All are the result of the peculiar idiosyncrasy of the strains of bees which make it. Just as amongst the human workman so it is with the bee. There is the neat, well-finished article fair to the eye and perfect to the understanding, and then the rough, slovenly job not fit or fair to behold. There is the capping that is so irregular that it is well nigh impossible to remove a frame without breaking away some of the cappings that are projecting beyond the general line of the comb, whilst a little further on we find them sunken almost down to the mid-rib. Occasionally a spell of wet weather or a stoppage in the honey flow causes an irregularity in the comb, but, making allowance for such, there are some bees which will not build attractive combs under any conditions. I happen to have such a colony myself, and, although their work is of the roughest, the honey is of the finest, and the pace they bring it in at outstrips all others by a

long way, yet if I worked them for comb honey I would be out of it entirely.

Again, we have honey comb which is always of a clear or watery appearance, which is known as "weeping" capping, and, although this is the most economical capping of any, seeing it is capped right down on the honey, hence the watery appearance, it is not held in high esteem for two reasons, one being that it lacks the colour of new comb, and another that it is more likely to turn sour if any damp get near it. Sections capped in this way are deceiving to the purchaser and disappointing to the seller; they are much heavier than they appear to be, as there is no air space between the honey and the capping, consequently they have a lean appearance.

We have now come to the third class. The capping with the beautiful almost white virgin wax laid so evenly over the top of the comb and showing in an instant that the little builders are master craftsmen in the art of wax-making, and neat in their work to a degree that becomes puzzling even to the human mind, and especially when looked at alongside the first class of capping mentioned. If we insert the blade of a knife underneath this capping we find a space between it and the honey often amounting to an eighth of an inch, which accounts for the whiteness. Often we find the entire surface of a large frame as level as a board when it is almost possible to remove the entire capping without ever touching the honey with the blade of the knife. This is the strain of bees we must look to if we are to excel in comb honey production, and which in a favourable locality will always turn out a saleable article, always providing the bee-keeper knows his business and takes care the honey is not left too long on the hive. This point must be emphasized, because no amount of excellence on the part of the bees can counteract careless management.

From the foregoing it will easily be gleaned that it is a more difficult task to produce comb honey than to produce the extracted article. Not only does it entail more labour but also more care and attention to detail, from the folding of the section and placing it in the super, during the time it is on the hive, and finally in scraping and cleaning it before packing it away.

Yet another very important item to take into consideration is the element of chance in working for section honey. It is known only too well that while many colonies of bees will work in sections just as readily as frames, there are a great many colonies will not do so, try as we may to induce them. Sometimes they will make a start and fill a few sections, then take it into their heads that such work is not natural, that it is against the instinct of their race and the traditions of their forefathers,

or rather mothers, to build comb in anything that is not suitable for raising brood in and thus perpetuating their race, and swarm, leaving their work half done with too few workers behind to complete it. Often even the most experienced bee-keeper is at his wits end to get bees to work in sections, yet it is rarely they object to extracting frames even when they have to go through excluders to do so. To the beginner this is one of the most disappointing features of bee-keeping. It can often be got over by placing a super of extracting frames on the hives after removing the empty sections; when these are half filled the sections are placed underneath and work proceeds apace.

IMPORTATION RESTRICTIONS.

Bee-keepers all over the country must, I am sure, feel grateful to the Minister of Agriculture for enforcing the restrictions on the importation of bees, etc., not only into Natal but also from passing through the colony to the sister States. It brings us into line with the Transvaal and the Cape in that direction, and has not come into force too soon by any means. Seeing that up to the present, as far as is known, we have no foul brood in South Africa, it behoves every bee-keeper or anyone interested in the welfare of the country to do their utmost to keep out this fearful scourge. Restrictions have been in force now for a considerable time in the Transvaal in this matter, but it will be apparent to anybody that so long as the Cape and Natal permitted the importation to go on the inland states could do very little towards keeping the disease out. Now, as the Cape and finally Natal have closed their doors, let us still hope for immunity. Also, that those endowed with authority to issue permits will make use of that authority with vigour and discrimination. Undoubtedly we must still get the bulk of our beeswax and comb foundation from oversea, but bees and queens we have got on our shores as fine as the world can give us, and suited to our climatic conditions.

[NOTE.—In the matter of legislation it was the Cape that led the way, the Transvaal and Natal following.—ED.]

RAIL FREIGHTS.

There is another matter connected with the bee-keeping industry that is craving for redress. In fact it should only be necessary to bring it to the notice of the right parties to have it set right at once. I refer to the heavy freight charged on bee products and appliances on our railways. Why eggs, butter, cream and all other South African produce should be carried at a very low rate, and honey charged at the highest rate is inexplicable to anybody, much less the producer who is trying to supply the South African public with a good, wholesome article that is to be had in abundance in the country. Bee-keepers deserve the same en-

couragement and consideration that every other producer of home products does, and why it should not be accorded him is only another of those incongruities that is beyond the reasoning of the lay mind. In asking that honey and hives, etc., be subject to the same rates as other products and farming implements we are not asking for a concession or a privilege but a right that should have been ours from the time that other products were granted it. It may be argued that bee-keeping is a hobby and honey a luxury, but neither argument can meet the case. Bee-keeping is more than a hobby since it supplies us with one of the most wholesome foods we can have, and as to being a luxury I fear the present high tariff on everything connected with it is likely to keep it such so long as it remains.

Just a case in point to show how matters work out in respect of freight on honey. A friend of mine a few weeks back had occasion to send a small box of peaches to a friend in another part of the Colony, and, having some nice section honey, put in a few sections also. This would have been carried at the S.A.P. rate for 1s. 6d., but that it contained two or three pounds of honey gathered beside where the peaches grow, yet not being in the S.A.P. rate, it cost the sender 4s. Could anything be more outrageous?

Natal Bee-Keepers' Association.

MONTHLY NOTES AND COMMENTS.

By W. C. MITCHELL, Hon. Secretary, Cedara.

ALL matter intended for publication in these columns should be forwarded to the Honorary Secretary, Cedara. It is hoped that members will avail themselves of the opportunities afforded by their official organs for discussing any matter of interest connected with apiculture. Any correspondence of this nature serves an educational purpose, and this is one of the objects of our Association.

* * *

Before these lines appear in print all members will have received a copy of our prize list and regulations for the approaching show. Any non-members who intend to exhibit should communicate with the Secre-

tary and secure a copy. The committee anticipate that some of the prizes may be increased ere the day of exhibition arrives. All exhibitors will receive a free pass to the show.

* * *

The weather throughout the Colony for the past fortnight has been all that can be desired from a bee-keeper's point of view, and where late flows exist good results should be secured before the season terminates.

* * *

The question of arranging some sort of social function for the occasion of the Show has been broached. Members who could possibly participate in such are asked to forward any suggestion they can on the subject. Would a dinner or a conversazione be the more popular? The Show is held on Thursday, Friday and Saturday, June 16th, 17th and 18th. Which of these three evenings would be the better? Probably Friday. Some slight charge will have to be made to defray expenses probably. Papers on apicultural subjects might be asked for, and the reading of these, with the discussions that would take place afterwards, would prove an attractive item on the programme. Members of the Association have far too few opportunities of meeting to discuss their favourite subject, and I hope therefore that a large number will make an attempt to attend.

PRICES OF BEE APPLIANCES.

THE BEE EDITOR "AGRICULTURAL JOURNAL," CEDARA.

SIR,—I do not think bee-keeping in Natal will pay or make much headway until there is a considerable reduction in the price of accessories. Take foundation for instance; this, with railage, costs me over 5s. per pound. Now, I can get it from England delivered at my door for about 2s. 9d. parcel post. By taking a quantity and shipping by steamer it would be less. The same with bottles; these were quoted in Maritzburg at 5s. 6d. per dozen. Taylor, Welwyn, quotes at 15s. 6d. per gross. I imported several gross, which came out at 1s. 11d. per dozen delivered. In the *Journal* market reports I notice honey quoted at 6d. per pound. Selling honey in a sixpenny pound bottle—not to mention wax and other expenses—is not a paying game. Some time ago I received a price-list from the Transvaal; evidently the bee-keepers there receive a fancy price for their produce, as Porter bee escapes at 7s. 6d., smokers at 10s., wax at 6s. 6d. a pound, etc., would require some return.—Yours faithfully,

"UP-COUNTRY."

[Our correspondent is under a wrong impression as far as the price of honey is concerned. Extracted honey of fair average quality if properly marketed will usually command at least double the price quoted above. As the questions raised by the above letter can best be answered by one in the trade a reply was called for from that quarter.—ED.]

Hon. Secretary, B.K.A.

DEAR SIR,—Thank you for forwarding “Up-country’s” letter on to me for reply, in which he complains about the cost of accessories.

First of all he seems to forget that bee-hives are sold at just about 5 per cent. profit. At present they cost 10s. 9d. per hive landed in Maritzburg, and are sold at 13s., less $12\frac{1}{2}$ per cent. to members of the Bee-Keepers’ Association, leaving a gross profit to the storekeeper of $7\frac{1}{2}$ d. per hive. This price, however, cannot be long maintained, as, owing to the great increase in the cost of lumber, the hives will, I think, have to be increased to 17s. or 18s. per hive.

Then, again, the “patent wood” foundation wax costs landed 2s. 8d. per pound, and is sold at 3s. 9d., less $12\frac{1}{2}$ per cent., equal to 3s. $3\frac{1}{2}$ d. per pound, leaving a profit of $7\frac{1}{2}$ d. per pound. Now, to import at this price the storekeeper has to import about 2 cwt. at a time, and this profit does not strike me as excessive when one has to consider the risk of damage, wax moth, bad debts, etc.

Honey jars “Up-country” makes a point of. These cost 15s. per gross in England, and the importing expenses are 75 per cent. without breakage, so they cost in Maritzburg 26s. 3d. per gross. As a rule 10 per cent. are broken, bringing the cost to 28s. 6d. These jars are sold at 3s. 6d., less $12\frac{1}{2}$ per cent., equal to 3s. $0\frac{1}{4}$ d., otherwise a profit of $5\frac{1}{4}$ d. a dozen, and those have to be sold in small quantities and packed free.

Now, it requires a very big turnover to make bee-keeping supplies pay at these prices, and the storekeeper has done his part to make bee-keeping popular.

As regards the price of honey, if all the honey producers amalgamate by joining the Bee-Keepers’ Association, this can be regulated so that it can be sold at a reasonable price that will not only pay expenses but leave a fair profit.—Yours, etc.,

W. J. F.

Mr. Martin touches an important point when he mentions in his notes in this issue the excessive charges incurred on railing honey. This matter is receiving the attention of the committee.

Ladysmith,

14th March, 1910.

Hon. Secretary, N.B.K.A.

DEAR SIR,—I have taken 150 pounds of surplus from my hives up to the present, and there is about the same amount left on which is uncapped.

Drones are being cast out of some hives.

All stocks, with the exception of two which I found queenless yesterday, are in good condition. I expect to winter 18 or 20 colonies and have plenty of extracting shallow combs to start with next season.

I will try and send some honey and wax for the show in June.—Yours faithfully,

A. B.

[Drones being cast out was probably the result of removing the honey. A sudden shortness of stores could only be met by a reduction in the garrison.—ED.]

EXHIBITING AT SHOWS.

M. U. Gubler, the president of the Society Romande d'Apiculture, gives good advice in the Society's journal in recommending bee-keepers to exhibit at the Swiss Agricultural Show to be held in Lausanne in September next, when he hopes the bee society will be well represented. He says the juries have frequently been ashamed at the poor show made by bee-keepers in contrast with the fine exhibits of other industries. He says: "One hears it frequently said, 'What is the good of showing? It brings in nothing, and there is all the trouble and expense.' and it is generally these who afterwards complain that they cannot sell their honey. But he who nowadays wishes to sell must do some advertising, and the best advertisement is showing the public the beauty and goodness of our products. Moreover, we are not simply 'grocers' seeking profit: the ideal bee-keeper aspires to something more noble, for he has the credit of his society at heart, and will do his best to have it properly represented."—*British Bee Journal*, 3rd February, 1910.

I trust the above clipping will catch the eye and attention of every member of the Natal B.K.A.

Many hens cease laying when they have plenty to eat and nothing to do. In such a case throw grain amongst straw or other light rubbish, and let the hens find it.

Maize for the Home.

SOME MORE RECIPES FOR MEALIE DISHES.

II.

LUNCHEON DISHES.

***HOMINY MUFFINS.**

Ingredients.—1 Cup cold boiled hominy; 2 cups flour; 2 eggs; 4 cups milk; 1 tablespoonful lard or butter; 1 tablespoonful salt.

Beat ingredients well together, and bake in quick oven in muffin tins or tin forms.

HOMINY CROQUETTES.

Ingredients.—1 Cup hominy; 1 tablespoonful melted butter; 1 cup milk; 1 teaspoonful white sugar; 2 eggs.

Add to boiled hominy melted butter, stir, and moisten by degrees with milk. Beat to light, soft paste. Rub in sugar and egg. Roll into balls with flour on hands, dip in beaten egg and bread crumbs, and fry.

HOMINY SOUFFLE.

Ingredients.—1 Pint hominy; 1 teaspoonful butter; 3 eggs; salt and pepper.

Add to freshly cooked hominy a palatable seasoning of salt and pepper, butter, and the yolks of eggs well beaten. Whip the whites to a stiff, dry froth, cut them lightly into the hominy, and turn into buttered pudding dish. Bake 20 minutes in a very hot oven and serve at once as it quickly falls.

GREEN MAIZE CAKES.

Ingredients.—1 Pint grated maize; 3 cups milk; 1 cup flour; 2 tablespoonfuls butter; 1 egg; salt and pepper.

Take grated maize, add ingredients, a little salt and pepper to taste. Fry in small cakes on griddle.

MOCK OYSTER FRITTERS.

Ingredients.—12 Young ears maize (or 4 cups); 3 eggs; $\frac{1}{2}$ tablespoonful flour; salt and pepper.

Cut the grain from the cobs, add flour and stir in yolks of eggs well beaten; whisk whites to stiff froth and add last. Season with salt and pepper. Drop a tablespoonful at a time on hot, buttered griddle, and fry on both sides.

* Term used for finely stamped mealies, which can be obtained from grocers. It is prepared in the same way as rice, but with more water, and it takes longer to cook. Hominy is also used for making porridge.

If eggs are not plentiful use one egg and one cup sour milk with half a teaspoonful of soda.

GREEN MAIZE FRITTERS.

Ingredients.—1 Pint grated maize; 1 tablespoonful butter; 1 egg; 1 teaspoonful salt; 1 tablespoonful flour; pepper.

Mix ingredients together, drop on buttered pans and fry ten minutes, or drop into boiling fat.

UNITAS MEXICAN RECIPE.

Ingredients.—8 Ears green maize; 1 tablespoonful lard; 1 tablespoonful white sugar; 1 tablespoonful salt; 1 pinch of cinnamon.

Grate the maize (which must be neither too green nor too ripe), melt the lard in a frying-pan, pour in the grated maize, sugar, salt, and cinnamon; and fry till cooked but not browned. If too dry pour in a small quantity of milk. Take large inside green leaves, place thick ends together and overlapping—put in tablespoonful of maize mixture and fold over the leaves forming small square packets, tied with strips taken from the leaves. Place these in a deep saucepan of boiling water and cook for half an hour. Serve hot. Enough for six people. If desired the maize mixture can be placed in a pie-dish and baked till brown.

STEWED MAIZE.

Ingredients.—6 Ears of fresh green maize; 1 oz. butter; 1 oz. flour; $\frac{3}{4}$ pint milk; salt and pepper.

Remove the husks and silk, cut downwards through the centre of each row of grains, then remove them with the back of a knife. Place the grains in a stewpan containing sufficient boiling water to cover them, simmer gently for half an hour, and drain well. Meanwhile, heat the butter in another stewpan, add the flour, stir and cook it for a few minutes without browning, then put in the milk. Stir until boiling, season to taste, add the prepared maize, and, when thoroughly hot, serve. Sufficient for five or six persons.

FRIED MAIZE (PRESERVED).

Ingredients.—1 Tin of maize*; 2 tablespoonfuls melted butter; 2 eggs; salt and pepper.

Pound the maize in a mortar until quite smooth, then work in the melted butter and eggs, and season to taste. Form the mixture into small oval or round shapes, fry both sides until lightly browned, then serve. Sufficient for five or six persons.

DINNER DISHES.

STAMPED MEALIE SOUP.

Ingredients.—1 Cup stamped mealies; 6 cups milk; 1 tablespoonful butter; 1 tablespoonful flour; pepper and salt.

* Sweet or Sugar Corn.

Stand mealies in cold water to swell, then boil until very tender. Put milk in saucepan with salt and pepper to taste, and stand in pan of boiling water, or use a "double boiler." Rub the cooked mealies through a sieve, or crush fine with a potato masher. Stir into hot milk. Rub butter and flour to a smooth paste and add. Let the mixture cook a few moments, when it is ready to serve.

MAIZE SOUP.

Eight ears of maize to eight or ten persons.

Boil the maize on the cobs for 20 minutes or half an hour. Pour off the water, then cut the maize from the cobs and crush with potato masher or pound in a mortar.

Add milk according to quantity desired, and flavour with butter, pepper, and salt to taste. Boil all together and strain through a sieve.

CREAM OF MAIZE SOUP.

*Score kernels of 6 ears of green maize, and scrape pulp; simmer for 20 minutes in kettle with cobs and one pint of water; remove cobs and rub pulp through a sieve. Scald one pint of milk with slice of onion and sprig of parsley. Remove these seasonings and add mild to pulp and 2 teaspoonfuls each of butter and flour rubbed together smooth. Season and serve with a small quantity of whipped cream in each dish.

TOMATO AND MAIZE SALAD.

Pour boiling water over large smooth tomatoes to loosen the skins, and set on ice. When perfectly cool, take out the centre of each tomato with a spoon and fill the cavity with boiled maize cut from the cobs, and leave to get perfectly cool. Then serve with Mayonnaise dressing.† Arrange the tomatoes on a cold plate lined with lettuce and leave on ice until wanted.

MAIZE PUDDING.

Ingredients.—6 Ears of green maize; 3 eggs; 1½ pints of milk; salt and pepper; nutmeg.

Grate the maize, beat and add the eggs stir in the milk, and season to taste with nutmeg, salt, and pepper. Pour the mixture into a buttered pie-dish, bake in a moderately hot oven for about one hour, then serve with a sweet sauce. Sufficient for five or six persons.

* "Scoring" of green mealies simply means cutting each row of grains downwards through the centre with a sharp knife, and then pressing out the pulp with a blunt knife or the back of a knife.

† Take the yolk of one hard boiled egg, mash, and add salt and pepper and mustard to taste; then rub smooth with salad oil. Put in the uncooked yolk of one egg, add more oil slowly, stirring constantly until the consistency of a custard. Lastly, add vinegar, enough to give a pleasant acid taste.

MAIZE BREAD PUDDING.

Ingredients.—2 Stale maize muffins—or maize bread; $1\frac{1}{2}$ pint of milk; $\frac{1}{2}$ cupful of sugar; 3 eggs; 1 teaspoonful (small) ginger; 1 teaspoonful (small) cinnamon; salt.

Steep muffins or bread in milk; when soaked squeeze rather dry, place in a bowl, beat up with sugar, a little salt, eggs and spices. Pour boiling milk over them, stirring all the time, then pour into buttered pudding dish and bake one hour in moderate oven. Serve with sauce.

NEW ENGLAND MAIZE PUDDING.

Ingredients.—2 Dozen ears green maize; 2 biscuits (crackers); 1 quart milk; 4 eggs; 4 tablespoonfuls sugar; salt.

Take ears of maize (young) and score from cobs; add biscuits (pounded), milk, eggs, sugar and a little salt. Bake two hours in a moderately heated oven. Serve with butter.

BOILED MAIZE PUDDING.

Ingredients.—2 Cups maize meal; 3 cups milk; 1 cup flour; $\frac{1}{2}$ cup suet; $\frac{1}{4}$ cup syrup; 2 cups dried apples; salt.

Boil the milk, pour it scalding on the meal, add flour and suet chopped fine. Soak apples in a little warm water to swell them, and mix them in the syrup. Add the other ingredients, salt to taste, and tie in a pudding cloth, allowing room to swell. Boil or steam for five hours.

BAKED MAIZE PUDDING (1).

Ingredients.—8 Cups milk; 2 cups maize meal; 2 or 3 eggs; 1 cup sugar and treacle (golden syrup).

Boil the milk and stir in the maize meal gradually. Take it from the fire, add eggs, and sweeten with sugar and syrup to taste. If whey is desired, reserve a part of the milk and add it cold. Bake in buttered dish for 2 or 3 hours.

BAKED MAIZE PUDDING (2).

Ingredients.—3 Tablespoonfuls maize meal; 1 quart milk (4 cups); 1 tablespoonful golden syrup.

Bring 3 cups of the milk to boil, and stir in maize meal mixed together with syrup. Add one cup of cold milk for whey. Butter a deep dish and bake about one hour.

BAKED MAIZE MEAL PUDDING.

Ingredients.—2 Quarts milk; $1\frac{1}{2}$ cups (small) maize meal; 1 tablespoonful flour; $\frac{1}{2}$ cupful suet; 1 tablespoonful ginger; sugar and golden syrup.

Put two-thirds of the milk on to boil; when boiling stir in maize meal, then take it from the fire and add the cold milk and flour. Sweeten to taste with sugar and golden syrup; add suet (chopped) and ginger. Bake in slow oven for $1\frac{1}{2}$ hours.

CAKES.

GOLDEN JOHNNY CAKE.

Ingredients.—Fine grain squash or pumpkin or ripe marrow; $1\frac{1}{2}$ pints sweet milk; 3 cups maize meal; 1 cup flour; 2 tablespoonsfuls baking powder; $\frac{1}{2}$ teaspoonful raisins; 1 teacupful currants; butter; sugar; salt.

Steam and mash squash or pumpkin with a little butter, thicken milk with squash pulp until like thick cream, and sweeten slightly with sugar. Add maize meal, flour, baking powder, raisins, currants and a little salt. Bake well in moderate oven.

*CORN FLOUR CAKE.

Ingredients.—Two cups granulated sugar; $\frac{1}{2}$ cup butter; 1 cup milk; whites of 7 eggs or 4 whole eggs; 2 cups wheaten flour; 1 cup cornflour, or maizena; 2 teaspoonfuls baking powder.

Take sugar and butter and stir to a cream; add milk, eggs well beaten, wheaten flour, corn-flour and baking powder. Flavour with extract of almond, lemon, or orange.

COCOA TEA CAKES.

Ingredients.—3 Eggs; 1 cup sugar; 1-3rd cup butter; $\frac{1}{2}$ cup milk; $\frac{1}{2}$ cup flour; $\frac{1}{2}$ cup maizena, or corn-flour; 3 teaspoonfuls (level) baking powder; 1 cup cocoa; $\frac{1}{2}$ teaspoonful vanilla.

Beat eggs (yolks and whites separately), then cream with sugar and butter. When smooth and light, add milk, flour and maizena sifted with baking powder and cocoa. Beat well, add a little salt and vanilla. Put in muffin pans, sprinkle with chopped nuts or desiccated cocoanut, and bake in a moderate oven.

Don't fail to wash and dry your hands before milking.

Don't put your fingers in the milk.

Don't milk without having first brushed your clothes.

Don't put the calf in a cold building; keep it warm.

Calves need daily outdoor exercise where they can get grass.

Laying hens want plenty of food. But let them work for it. Throw the grain at night amongst straw or other light litter.

* Corn-flour or maizena can be obtained from any grocer. It is an American preparation from maize.

The Canadian Fruit Industry.

By W. A. MACKINNON, B.A.,
Dominion Trade Commissioner at Birmingham.

(Continued from Page 159.)

THIS brings us to the subject of cooperation, through which many objects can be attained by groups of growers which they could not secure individually. Among these objects may be mentioned the cheaper purchase in large quantities of fruit trees guaranteed true to name; the similar purchase of apple barrels, boxes, and baskets of all kinds, of spraying materials, fertilisers and so on. Perhaps the most important, and certainly the most conspicuous work of these Associations is seen in the disposal of the crop, by which every member, no matter how large or small his orchard, how few or how mixed his varieties, is enabled to send his fruit to a central packing-house to be graded, receiving after sale exactly his fair proportion of the net proceeds. I had almost said no matter how good or how poor the quality of the fruit, but I believe the Association are becoming more strict with regard to the admission of members whose orchards are neglected, so that there is an undue proportion of third-class or culls among the product. It will be readily seen that the central packing-house transforms many small lots of many varieties and qualities into a few large lots of uniform grades, for which there is always a good demand at excellent prices. All that such a co-operative system requires to ensure success is loyalty on the part of the members and a good business manager in charge, conditions with which I am glad to say a number of the Canadian associations have been able to comply. I might point out also that under this system all temptation to false packing for the sake of private gain is done away with, as the packer is engaged at so much a day and the manager at a yearly salary, neither having any interest to serve by deceiving the public; the latter being, in fact, dependent for his position upon making and keeping a high reputation for the output of his employers as a whole.

In the Niagara district Mr. Livingston, of the "Weekly Fruit Grower," tells of two or three recent developments of the co-operative principle. One of these, known as the Fruit Buyers' Exchange, consisted of a number of dealers, most of them growers also, who agreed weekly on quotations which were sent out to all retailers in Canada. The secretary's office, with which all were connected by telephone, was used as a clearing-house to distribute unsold fruit in the hands of one buyer to customers of other buyers, who happened to be short of that particular

variety. Individual surpluses were thus used to make up other individual shortages, with the result that each night very little fruit was left to be sent out for sale on commission. This idea was further developed by the formation last season of a limited company which took all surplus stocks from the members and distributed it in car-load lots at points outside the range of general competition, particularly in Western Canada. It will be understood that few individual growers can furnish car-load lots, and obtain reduced rates by freight or express. I understand that this latter idea is growing rapidly in popularity, and that large numbers of fruit-growers are becoming shareholders in co-operative companies, which can ship car loads to their own agents in the markets of Eastern and Western Canada.

INFLUENCE OF THE PRESS.

From another direction also the fruit-grower obtains most valuable assistance. The admirable service rendered by the Press, more particularly by agricultural journals and those devoted exclusively to horticulture, is unequalled in any other country. Edited for the most part by men of practical experience and an agricultural college training, printed on good paper, with excellent illustrations, these journals command the respect and attention of the interests they serve. Their broadening influence and the practical help they afford by furnishing information, correcting errors, exposing or preventing frauds, reporting conventions, suggesting improved methods or supporting reforms, cannot be over-estimated.

FAIRS AND EXHIBITIONS.

In the presence of Mr. Gooderham, who presides over the destinies of Toronto's great Exhibition, easily the largest and finest annual show in the world, one hesitates to touch upon the subject of fairs. Suffice it to say that during the last few years it has been the policy of the Fruit Division at Ottawa, and of the Provincial Departments, to improve prize lists in the direction of increasing their educative value to those who grow fruit to sell, and not merely to show. To this end model prize lists have been submitted, and in many cases adopted, offering substantial awards for commercial varieties, and for commercial packages put up as for market at home or abroad. It is now pretty generally recognised that, while the amateur and the experimenter in new sorts should not be overlooked, the bulk of the prizes should no longer go to the exhibitor of the biggest apples or the most numerous varieties. After all, the admittedly best "money makers" in each district comprise but a few sorts, which are the ones to be encouraged and improved by carefully drawn prize lists.

Awards may also be made for tasteful displays of fruit arranged for sale, as in a fruiterer's window, or for dinner table decorations of fruit

and flowers combined, since attractive display always leads to increased consumption.

THE FRUIT-GROWER'S LIFE.

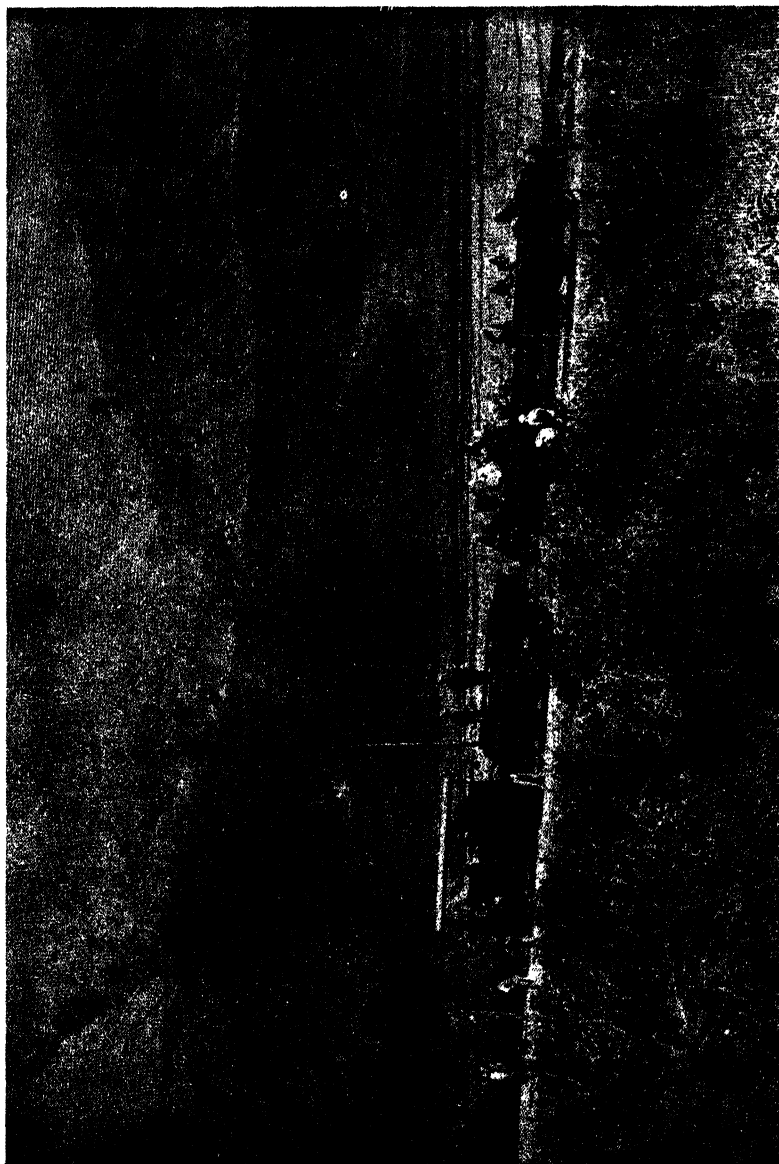
As for the life of the fruit-grower, I consider it one of the most attractive in the world, since it combines out-door work under delightful conditions with the necessity for mental activity and alertness. Ruskin has told us that just so far as a man's work consists in mere manual labour, it is servile and degrading, even though "in measure refreshing, wholesome, and necessary." Some will perhaps take exception to this view, but all will admit both the charm and benefit of open air physical exercise, and the absolute necessity of similar scope for the mind, if the human being is to attain to the highest degree of all-round efficiency. These two things fruit-growing offers in perfection. Even in winter, supposing the last of the apples have been packed and shipped away, the grower has pruning to look to, buildings, harness, and implements to overhaul and repair, ice to get in for summer use, and a stock of firewood to secure—often from his own piece of "bush." In off seasons, too, there are under-drains to be put in order, fences to be repaired, posts to be sunk or wire to be strung for the support of young grape vines—so much for the physical side; while meetings of farmers' institutes, horticultural societies, fruit-growers' associations, or other public bodies, and correspondence relating to next year's operations are quite enough to keep the mind keen and active. From the time cultivation commences in spring until the last of the apple crop is safely harvested, our friend has constant, though not over-taxing occupation, for he generally has a full range of fruits, both large and small, cherries, berries, and currants; early and late sorts of apples, pears, and peaches, covering a long season, besides plums and grapes. Spraying was probably begun with an application in mid-winter, is repeated when the buds are swelling, before and after the blossom, and once or oftener in the summer, according as conditions favour or retard the development of fungus diseases. This is one of the most delicate operations of all, since if not done properly and at just the right time, it is almost a useless expense. On the other hand, no portion whatever of modern fruit culture is so absolutely essential to success, or pays such liberal dividends upon its cost: be the crop large or small, clean fruit will always bring the top price.

The picking season demands the employment of much casual labour, a great share of which falls to women and children, and thus the families of the permanent help are able to supplement, by sums not to be despised, the earnings of the men. Hundreds or thousands of fruit baskets with netting covers and wire fasteners must be provided in advance and stored on the premises, for when the season is at its height it is often all but impossible to obtain fresh supplies. Address labels in plenty must also be on

hand, though for regular shipments the address is usually placed on the handle of the basket with a rubber stamp provided with the shipper's number for identification. Then, day by day, the pickers are directed to those fruits or varieties which are ready, and the wagons are kept busy collecting their filled baskets and supplying them with empties. Meanwhile, a staff is occupied in the packing-house grading and putting up the fruit; pears, peaches, and plums usually in baskets holding from sixteen to eighteen pounds, grapes sometimes in similar packages, but more frequently in the ten-pound basket, and sometimes, if to be used for wine, in barrels. About noon the fruit-grower is called to the telephone to receive market reports from all over the country, and then comes the problem of disposing of his day's pack to the best advantage; decisions have to be made quickly and as promptly carried out, ripe fruit to go to convenient markets, other lots to more distant points, the firmest perhaps into cold storage and refrigerator cars for the far West, that tremendous and growing market which already competes with Great Britain for Eastern and Pacific Coast fruit. And so the work goes on. Baskets are stamped or labelled and placed in stacks of ten or twelve, drays are loaded for the railway station in time to catch the "Fruit Special," or, if the grower is fortunate enough to be on the line of an electric railway, his shipments need be taken no further than to a roadside platform in front of his house to await the arrival of the freight car. In either case, the day's picking from the Niagara district will be on sale in the markets of Montreal, Ottawa, and all nearer points, early next morning, and will be in the hands of the retailer before noon.

When the big rush of the afternoon shipments is over, our friend follows the good old English example and looks for some recreation in sport, the younger men taking to tennis, cricket, or golf, while their seniors are more often to be found on the bowling green. Meanwhile, the help is still engaged in picking and packing until six o'clock, when the normal day's work is done. In the height of the busy season, however, especially if a heat wave is ripening peaches fast, all hands are set to picking while daylight lasts, and continue sorting and packing by lamplight up to ten o'clock or even midnight, the fruit in such cases to be sent to market by an early morning train. Such being a rough sketch of the day's work, need I add that bromides and other sedatives have but a poor sale in Canadian fruit districts? And need I say more to commend the conditions, the activities, the fresh-air charm, the physical and mental wholesomeness of the fruit-grower's life?

In conclusion, may I ask you to think of the miracle that has been wrought upon the North American Continent? Remember how British hearts and French battled their way to it in wretched sailing ships, across an Atlantic that was seldom merely "mournful and misty"; how they seized a foothold on her rocky and forbidding coasts when the cruel north



ROAD TRACTION.—II.

One of the Renard Trains at work in India. Ascending the gradient of the Ganhati-Shillory Road.

(See *Article by Mr. J. F. E. Barnes*.)

wind bared his fangs, even as the Indian his tomahawk; how they fought the Red Man, and famine and snow and ice, held doggedly on though supplies failed and crops were destroyed, and at last drove back their enemies, subdued the forest, and tamed even the climate itself; how they fought the battle of race supremacy, and settled it finally by equality under the British flag; how, loyal to the flag, thousands of them left their homes in the settled but revolted States, and, taking up once more the burden of the pioneer, carved new homes out of the forests of Upper Canada, fought for these homes in 1812, and again for their liberties in 1837; how their sons forced a pass through the wilderness of the great prairie beyond the lakes; how with such leaders as our honoured chairman, the wild North-West was stormed, and the eternal mountains, the giant Rockies, conquered, till Pacific was linked with Atlantic, and the British Crown had in very truth "dominion also from sea to sea, and from the river unto the ends of the earth." Have you realised how every step has been a struggle, every acre occupied a battle, every province wrested from the Great Unknown a campaign, sometimes against human enemies, more often against the forces of Nature? But how generous a foe has Nature proved! How gracefully does she admit defeat, and how lavish the spoils she hand over to the victor! Every summer, where once stood "the forest primeval," the fruits of the earth are multiplied; every autumn thousands of orchards bend beneath the weight of their crops. But let us realise that a Canadian apple is not merely the fruit of the tree upon which it grew, it is the fruit of history, of men's lives, of generations of patient effort and silent achievement, which we do well to remember with honour. Nor are these the only trophies of man's triumph. Think of the limitless treasures of the mine; think how Nature is to-day yielding up the untold wealth of forest and stream; think of the water-powers she reveals in endless succession, and of the millions of acres she covers year by year with waving gold, gold indeed to the grower, and food, more precious than gold, to the dwellers in cities! Such is the bounty of Nature to those who prevail.

If a sow does not attain a good growth before bringing her first litter, the chances are against her reaching the desirable size for proper strength and vigour.

The beef calf should be fed about the same as its dairy brother or sister, only it takes from two to four pounds of milk more per day to satisfy him, and one should let him have whole milk for a longer period, which is thirty days.

Cape Fruit Export.

REVIEW OF THE 1909 SEASON.

III.

THE following is a continuation of the report by the Cape Government Trade Commissioner in London on the Cape fruit export trade, the second instalment of which appeared in our last issue:—

The quantity of pears shipped during the past season shows a good increase over that of previous season, 55,129 boxes against 51,614 for 1908, while the shipments for 1907 amounted to 22,213.

There is a good demand for pears on these markets at medium and low prices. They are a fruit well known to the British public, but consumers will not pay a fancy price for them, excepting for very small quantities. The quality of Cape pears is very much appreciated; it is easily superior to similar fruit from other Colonies.

Pears enjoy a long season compared with other Cape fruit; the first shipments arrived during the last week in January, and consignments continued to be received up to the middle of March.

The first shipments made from 6s. to 8s. per box of 20 to 24. During the middle of February "Bon Chretien" pears were selling at 5s. to 6s.; "Clapps' Favourites" fetched 4s. to 5s.; and other varieties about similar prices. At the end of that month "Bon Chrétiens" were making 3s. 6d. to 5s. 6d.; "Clapps' Favourites" and "Beurre Bosc," 3s. to 4s. 6d., while the same varieties packed in large boxes, *i.e.*, counts of 80, 72 and 54, made 6s. 9d., 7s. 6d., and 10s., the smaller counts making relatively higher prices.

During the first week in March the following prices were made:—"Bon Chretien," 3s. 6d. to 5s.; "Beurre Hardy," 2s. 9d. to 3s. 6d.; "Louise Bonne," 4s. to 5s. in counts of 20 to 32, while pears in boxes of 80, 82 and 54 were making 5s., 6s. and 8s.

During the second week of March a very large shipment of 13,000 boxes arrived, and these made from 2s. 3d. to 4s. for the ordinary size boxes, while the large boxes were making 5s. to 6s. On the 13th March another large shipment arrived, in addition to which the intermediate shipment brought a considerable consignment, the total for the two ships exceeding 15,000 cases. Unfortunately, also, the weather was exceedingly unfavourable, and, in consequence, the resources of the consignees and salesmen were severely taxed. Prices were, however, maintained at the level of the previous week.

During the week ending the 2nd April the following prices were recorded:—"Bon Chretien," 4s. to 6s.; "Beurre Bosc," 4s. to 6s.; "Beurre Hardy," 3s. 6d. to 5s.; "Louise Bonne," 4s. 3d. to 5s. 6d.; "Winter Nelis," 4s. 6d. to 5s. 6d., for counts of 20 to 32, large boxes making 6s. to 7s. Up to the middle of April the prices for these varieties were from 3s. 3d. to 6s. From the latter portion of April to the close of the season prices were considerably better, "Buerre Bosc" making 6s. to 9s.; "Winter Nelis," 6s. 6d. to 8s.; and "Glou Moreau," 6s. 6d. to 7s. 3d., for counts of 20 to 32.

During the first part of the season practically all consignments arrived in a very good condition, but later on a "wasty" condition was observable in a considerable proportion of the arrivals, particularly amongst the "Bon Chretien," and this variety comprised the larger share of the total shipments. "Bon Chretiens" are a very popular pear on these markets, but they are very bad travellers, as they ripen so quickly. The general mistake is to pack the fruit too ripe, and it requires the greatest skill and experience to know exactly when to gather it for packing. Only expert packers should be employed in packing this variety of pear.

The other varieties, though not quite so popular, made fair prices and generally arrived in a good condition, particularly "Louis Bonne," "Beurre Bosc," "Winter Nelis," and "Glou Moreau."

During the season 1908 I wrote to ten leading fruit salesmen in Covent Garden and the Provinces, asking them to give me the names of ten varieties of pears which they thought they could sell best: excepting as to "Bon Chretien," their verdict was by no means unanimous.

I give the list of 12 varieties in accordance with the greatest number of recommendations:—

William Bon Chretien.	Glou Moreau.
Doyenne de Comice.	Duchesse D'Angouleme.
Louise Bonne.	Beurre Clargeau.
Beurre Bosc.	Souvenie Du Congres.
Winter Nelis.	Easter Beurre.
Beurre Hardy.	Clapps' Favourite.

The method of packing pears is well understood by Cape packers, the small counts 20 to 32 may be a little more costly, but they seem to make better prices than the large counts of 54 to 80. It is, however, desirable that the greatest number of pears be packed in a box in the most economical manner for shipment to make the trade profitable, and they will have to be sold at low prices so as to enable the market to take large quantities.

During the past season some of the shipments arrived in very bad condition, the fruit being almost entirely rotten. It was subsequently

found that these consignments had been cold stored in Capetown for some time before shipment with a view to regulating the quantities. I must ask shippers not to follow a similar course in future. If there is room in the ship the fruit should be shipped immediately it is ready for despatch, even if it has to be sent by one of the intermediate steamers. It must be left to the consignees or agents on this side to decide upon arrival of the fruit whether it can stand further cold storage, and the agents will decide how to regulate the quantities to be put on the market.

British Columbian growers have sent over hardy varieties of pears in boxes measuring 20 x 15 x 10 inches, holding about 40 lbs. each. Each fruit was wrapped in a piece of paper; the sides, top and bottom of the boxes were slightly protected by wood wool and paper, and all the fruits arrived in an excellent condition after a journey of between two and three weeks. I mention this in case some Cape shippers may like to experiment in exporting pears packed in this method in anticipation of the expansion of the market here.

GRAPES.

The total shipments of grapes during the past season amount to 32,323 boxes, against 77,367 the previous year. Cape grapes must be looked upon as a fairly high-priced fruit, and, as such, the demand is necessarily somewhat limited. The demand will, however, gradually increase when it is more widely known that this fruit can be obtained in the European markets during the winter months, and I see no reason, provided the grapes arrive in good and sound condition, why these markets should not take 80,000 boxes of grapes during the forthcoming season. The reason why the grapes made bad prices during the 1908 season was not because the shipments were excessive, but because they arrived in a bad condition. (I am dealing with the cause of the bad condition in another part of this report.)

During 1909 season a marked improvement in this respect was noticeable. The first consignments commenced to arrive during the last week in February, and shipments continued up to the middle of May.

Prices.—The first shipment of "Hermitage" made 3s. 6d. to 5s. for 10 lbs., but they were of poor quality. During the following week the same variety made 6s. to 6s. 6d. per 10 lbs., the grapes being of better quality and in sound condition.

During the week ending March 19th, the following prices were recorded for sound grapes:—Hermitage, 5s. 6d. to 6s. 6d.; White Hanepoot, 5s. to 7s.; Red Hanepoot, 6s. 6d. to 8s.; Raisin Blanc, 5s. to 6s. The prices continued at about this level up to the first week in April, when the amounts obtained for red and black grapes showed considerable increase, viz.:—Red Hanepoot, 8s. to 9s. 6d.; Barbarossa, 7s. to 8s.; Hermi-

stage, 6s. 6d. to 8s. 6d.; White Hanepoot, 4s. 6d. to 5s. 6d.; Raisin Blanc, 3s. 6d. to 4s. Barbarossa packed in 6 lb. baskets 4s. 9d., and Raisin Blanc 3s. 6d.. Hermitage packed in 6 lb. boxes with no wood wool, sound, 3s. 3d. to 3s. 9d. During the following weeks the consignments received were rather wasty and prices fell in consequence. April 30th: Raisin Blanc, 4s. 6d. to 5s. 9d., 10 lbs., and in 6 lb. baskets, 4s. 9d.; Red Hanepoot, 4s. to 5s. 6d.; White Hanepoot, 2s. 6d. to 3s. The prices for the last shipments of the season were: White Hanepoot, 2s. 6d. to 5s. 6d.; Red Hanepoot, 4s. to 5s. 6d.; Hermitage, 3s. to 5s., all rather wasty.

I kept a fairly comprehensive record of the prices for each week throughout the season, and on averaging those obtained for each variety, the result is as follows:—

Red Hanepoot, 7s.; Barbarossa, 6s. 9d.; Hermitage, 5s. 6d.; Raisin Blanc, 5s.; and White Hanepoot, 4s. 9d. All the above prices, unless otherwise stated, are for 10 lb. boxes; and for grapes which arrived sound or fairly sound the prices for 20 lb. boxes were very nearly double the above.

The foregoing results will show that Red Hanepoot is the most profitable grape to ship, and that black grapes make better prices than white. White Hanepoot is not sufficiently attractive for the English market; the buyers are extremely critical and they notice the small marks and blemishes on the berries which do not show up on the red variety.

In my last report I urged shippers not to ship the Black Prince and French grape, as the berries of these varieties are much too small for this market. A few growers evidently did not read my report, or if they did, **disregarded** my advice to their cost: a few shipments came forward and **were quite unsaleable**. A Covent Garden salesman, who had them for disposal, said to me that they were more like currants than grapes, and that he could not sell them.

I saw a small shipment of the "Lady Down Seedling" arrive. They are dark grapes with large berries growing loosely on the bunch, and are just the kind of grape which this market requires. They approach the Belgian hot-house grape in appearance, but are of better flavour. If growers were to grow these on trellises, thin them out and ship them in chip baskets in crates they would make big prices.

The class of grape which is desired on this market can be described as follows:—Large berries hanging free and loosely on the bunch, red and black preferred. The bunches must not be tightly grown, nor be of a scraggy appearance, but must have a good shape. The grapes must arrive fresh, if possible with the bloom; the bunches must not be fingered unnecessarily, but handled only by the stalk. It is absolutely necessary that the packers be supplied with grape (thinning out) scissors with which to

trim the bundles and pick out all the over-ripe, immature or damaged berries.

I think it necessary to quote the following paragraph out of my previous report on grapes, as follows:—

“One of the most important lessons which has been learned in connection with the export of Cape grapes, is that the grapes which have been brought from shady places or on damp soil have proved quite unsuitable for transport, whereas those grown on dry, sunny parts on higher land and well drained soil, though the berries are much smaller, have always travelled well. I must ask the growers to give this matter their serious consideration. I have seen large shipments of the most beautiful grapes which I know to have been grown in shady and moist situations arrive here in an absolutely wasty condition, which has caused considerable loss to the shippers.”

Growers should test the capabilities of their vineyards for producing grapes suitable for export by taking advantage of the cold storage experiment scheme which is contemplated by the Government, and which is referred to under another heading in this report.

I must once again urge upon growers to try the experiment of thinning out their grapes when the berries are about half developed. I know that it is very troublesome to thin out grapes which are grown so low on the ground as the Cape grapes are usually grown, but this is hardly a sufficient excuse for not doing it at all. Will a few growers oblige me by trying a small quantity, and when they ship them, mark the boxes and advise me; I will then get special reports from dealers and see the results. I think growers should also consider the advisability of growing grapes for export on trellises with sides and tops, so as to shade the grapes from the sun, and keep them clear from the ground, and further from the dust; it will also be more convenient for thinning out; it will pay them well if they get 6d. to 9d. a lb. for their grapes.

Packing.—Grapes are the most difficult of all Cape fruit to convey to these markets. It is not generally known that the Cape is the only country which has succeeded in shipping grapes in cold storage for such a long distance. Australia has attempted it for double the distance, but has not yet got out of the experimental stage. Because it is such a delicate fruit it requires the greatest care in packing; it is very necessary that this matter should be carefully studied, so as to overcome the difficulties of transportation, for it is of the greatest importance to the Colony that a successful and extensive grape export trade should be developed.

The class of grape which is exported from the Cape is considered a:

good class of table grape, but to maintain this position it must look well when it arrives. It is not usually bought simply as a dessert fruit, more particularly during the cold winter months, but is largely used for table decorative purposes with flowers. If it is in any way wet or wasty, or has lost its bloom, it has lost more than half its value, or probably all its value to some purchasers. For these reasons I am of opinion that the present system of packing in boxes and wood wool is not satisfactory. For this method of packing it is necessary, after cutting the grapes in the vineyard, to convey them in baskets to a packing house on the farm where it is possible that the basket is overturned to empty it. The grapes are then examined, trimmed, wrapped in paper and finally tightly packed (with wood wool) into boxes. If they are not tightly packed they are apt to become damaged very quickly. With all this packing and handling, how can the grapes be expected to arrive in a fresh and attractive condition with their natural bloom? Growers must remember that it costs them 3d. to 3½d. per lb. to ship and sell their grapes in England. A considerable margin must be left for bad shipments: they must therefore get 6d. to 7d. per lb. to bring them on the right side. This means that the retailer will have to sell at 1s. to 1s. 3d. per lb. to secure a moderate profit, as he has also a loss by waste. At these prices the buyers want sound and attractive fruit, otherwise by paying a little more they can buy hot-house grapes which have been thinned out and which are transported in baskets so as to maintain their bloom.

I have noticed that only the cheap varieties of grapes, such as the Almeria and Sweet Water and other inferior imported varieties are packed in any sort of packing material (for these cork and sawdust are used), but for none of the better varieties arriving on these markets is any sort of packing used; these are all shipped in baskets and crates. Though the method I advocate of shipping grapes is based upon the principle of other countries, I have had to make several considerable modifications, having regard to the different conditions and the longer journey from the Cape particularly, as it is necessary to make use of a non-returnable crate and basket.

I have, I may say, devoted much thought to the subject, have made many observations and enquiries, and have tried various experiments with the object of devising a scheme by which the grapes can be brought over in a sound and attractive condition, without unnecessary handling, and, needless to say, without much additional expense. I therefore suggest to shippers that they should try the method of packing which I will now describe.

CRATES AND BASKETS.

During the previous season, some shippers, on my recommendation, kindly made experiments by shipping grapes in crates and baskets which were forwarded from this side. These were large crates containing 12 six to seven lb. baskets each, packed in three layers, the total net weight of grapes per crate being about 80 lbs. The experiment proved that the grapes would travel exceedingly well in baskets, as they arrived on this side fresh and with the bloom still on them. It was, however, found that the crates were too large to be convenient for the trade. Some losses were incurred in consequence of the inside shelves breaking.

At the commencement of the experiment, as the grapes packed in baskets were new to the trade, buyers were cautious at first to stock them. Benefitting by the experience thus gained, and with the assistance of the manufacturers of crates and baskets in England, a smaller and more compact crate was devised, and with a view of illustrating this new method of packing to the growers I have forwarded to your Department three sample crates, each containing eight small baskets in two layers. These are neat little crates, which will be very convenient to handle, and suitable for the requirements of the trade here.

The three samples differ slightly one from the other, which will enable the shippers to decide for themselves which they consider the most suitable for their requirements.

No. "1" Crate.—Outside measurements, 29 x 16 x 9½; cost of crate, packed in shooks, f.o.b. London, 97s. per 100; estimated freight, duty and landing charges, 33s.; total cost per 100, landed Capetown, 130s. (or about 1s. 4d. each).

No. "1" special baskets, to fit the above crate (with handles), to hold 5 lbs. of grapes, 12s. per gross, f.o.b. London. Estimated freight duty, etc., including margin of profit for importers, 10s. per gross; total cost per gross at Capetown, 22s.

No. "2" Crate.—Outside measurements, 25½ x 15½ x 10, to hold eight 4½ lb. plaited chip baskets, with handles. The cost of this crate and the baskets will be practically the same as No. "1" crate.

No. "3" Crate.—Outside measurements, 24 x 15½ x 10, to hold eight 4 to 4½ lb. chip baskets, *without* handles. The total estimated cost of crates landed Capetown is 1s. each. Cost of baskets for same, f.o.b. London, 11s. per gross, plus estimated freight, duty, etc., 6s.; total, 17s. per gross, Capetown.

As a guide to shippers and for the purpose of comparing the cost of shipping by this method with the present method of packing, I have made the following estimate:—

	No. "1" crate to hold 40 lbs. grapes.	No. "2" crate to hold 36 lbs. grapes.	No. "3" crate to hold 32 lbs. grapes.
	s. d.	s. d.	s. d.
Cost of crate in Cape Town ...	1 4	1 4	1 0
Cost of 8 baskets in Cape Town ...	1 3	1 3	1 0
Cost of paper and nails ...	0 3	0 2	0 2
Railage and dock dues ...	0 8	0 8	0 6
Freight in cold storage in ship ...	3 11	3 4	2 10
Cost of labour on farm for putting up crates, packing, etc. ...	1 0	0 10	0 9
London charges reckoned on a basis of about 10 per cent. ...	2 5	2 0	1 9
Equal to ...	10 10 3½d. lb.	9 7 3½ lb.	8 0 3d. lb.

I think it will be agreed that my estimates are liberal, and, if compared with the cost of shipping grapes in boxes as per statement in another portion of this report, it will be found that the grapes shipped in boxes of 10 lbs. work out at 3d. per lb. delivered and sold on this market. The estimates are on the same basis.

The baskets should be lined with white, transparent, grease-proof paper, and be covered with a single sheet of the same paper when full.

The baskets and crates might, with advantage, be got ready some times before it is necessary to cut the grapes, and when it is intended to commence packing, the crates with the empty baskets should be placed at convenient spots in the vineyard.

The packer should be supplied with a strong pair of grape clippers and a small, sharp pair of thinning-out scissors. He will then cut the bunch from the vine with the former, hold it by the stem and pick out any over-ripe, damaged, or green and small berries. He will also trim the bunch so as to give it a nice shape. Each bunch of grapes should be laid in a single sheet of white sulphite tissue paper of convenient size, not wrapped, and placed gently into its place in the basket. The grapes should not be touched by the hand. When the baskets are full a sheet of white, transparent, grease-proof paper is drawn over the top and fixed with a thin elastic band or piece of string, the former being more convenient. The basket should then be placed in its place in the crate. When the crate is full, the lid, which has already been stencilled with the required marks for shipment, should be nailed on. The full crates should then be forwarded without delay to the nearest railway station.

It is perhaps well that I should mention that all crates should be clearly marked on the upper lid only with the following words:—

THIS SIDE UP, HIGHLY PERISHABLE, WITH GREAT CARE.

(And also with the Shippers' and Consignees' Marks.)

The packer, having first ascertained the weight of the crate and baskets when empty, should then weigh the full crate so as to ascertain the net weight of the contents. A card should then be nailed at the end of each crate, giving the name of the shipper and consignee, or agent, the varieties of grapes and the net contents.

The advantages I claim for this method of packing are:—

- (a) That the grapes will not be handled or fingered while being packed; there will be no necessity to send them to a packing house; nor to wrap them in paper or wood wool.
- (b) That the grapes will travel better and retain their bloom and freshness, whilst the percentage of losses in a shipment will be considerably less than under the present system of packing in boxes.
- (c) That the basket is a convenient package for the retail trade on this side.
- (d) That when the grapes are offered for sale the buyers can examine them more readily. It has always been found very difficult for buyers to ascertain the actual condition of the contents of boxes under the present system, and any doubt on the subject may effect prices prejudicially.

In view of the facts given above, I trust that growers of grapes may find it in their interest to give this system a trial. I do not ask them to ship all their grapes in crates and baskets, but think they should make experiments with small quantities.

(To be continued.)

Eighteen-month to two-year-old heifers are ready for breeding.

Just as soon as the separating is done, take the skim milk, while yet warm, to the calves.

Activity keeps hens in good laying condition. Loitering fowls get fat, lazy, and eggless.

Don't strike at the cow that strikes at you because her teats are sore; apply a little vaseline to them.

To wean pigs before they have been taught to eat will give them a check for at least two weeks.

Lucerne Tylenchus.

A SECOND WARNING.

IN our January issue we took over from the *Cape Agricultural Journal* an article on Lucerne Tylenchus, which it was considered advisable to reproduce in view of the increasingly large areas which are now being planted with lucerne. In the February number of the same journal appears a further article on the same subject, which we also take the liberty of reproducing, at the suggestion of the Chief of the Division of Entomology and Horticulture. This second warning note is issued in view of the fact that "it is highly advisable that parties who may be about to plant lucerne be cautioned to avoid introducing the pest."

The pest (the writer of the article, Mr. C. P. Lounsbury, says) is an almost microscopic, whitish worm which infests above-ground parts of the plant. It may have a number of generations in the course of a year, but if the conditions become unfavourable to it, it may rest in a dormant condition for many months at a time. It can come to rest in cut lucerne and be restored to activity at a distant date, when perhaps the lucerne that contains it has gone with manure on to other lucerne fields. Bits of stem that contain it may be blown about and thus lead to establishment in previously clean fields, and soil or rubbish in which it has come to rest may be spread by farm implements, the feet of animals and in other such ways.

South African experience clearly shows, however, that the pest is chiefly spread with lucerne seed. The circumstantial evidence that this is the case is overwhelming, and whereas fields in which only high-class imported seed has been used are clean almost without exception, fields sown during the past few years with seed grown in the older lucerne districts of the Colony seem almost as often as otherwise to be more or less infested. So far as has yet been determined, it is impracticable to distinguish infected seed from non-infected seed, and impracticable to destroy or remove the infection without killing the seed. It is known that the pest enters onion seed in Europe, and the highest authority on the subject, after close study, announced that he could not tell an infected seed from a normal one. Seed from badly-infested plants, however, produced some infested seedling plants. Onion seed can be disinfected, it is said, by soaking it in dilute sulphuric acid. Lucerne seed, unfortunately, itself succumbs if subjected to the treatment.

The Government had Mr. T. F. Dreyer, a South African who is

studying in Germany, visit the chief lucerne districts of France during the past season to learn what he could about the pest. Mr. Dreyer ultimately reported that he failed to find it in French lucerne fields, but that it gave some trouble in lucerne in parts of Germany, where, however, seed was not grown for sale. The French Department of Agriculture has since sent an assurance that the worm is not a pest in lucerne in its country. These facts, taken in conjunction with the fact that Colonial fields in which only imported seed has been used are almost invariably clean, indicate that one is unlikely to introduce the pest with high-class Provence (French) seed. By "high-class" is meant an article that has been cleaned by a reliable seedsman.

Farmers may not know that most of the Provence seed imported into South Africa is obtained from English seed houses. The better English houses take great care in the cleaning of their supplies, chiefly to eliminate dodder and weed seeds, and their operations must diminish any chance that *Tylenchus* accompany the lucerne. The writer expects to be able to prove positively that infection of *Tylenchus* is *within* the seed and that it would go with the seed from a much-infested field however carefully that seed were cleaned; but he believes that when a stand of lucerne is only very slightly infested, as seems probable in the case in Provence when the pest does occur there, the chief danger is from bits of dirt and stem. The cleaning of the seed practised by the best seed houses removes most of such foreign matter. In a recent letter, one of the firms wrote:—

"As a result of our enquiries we think there need be no fear of *Tylenchus devastatrix* being imported in the lucerne seed if buyers will only take care to buy the finest quality re-cleaned seed. . . . We are keeping a record respecting the average purity, germination, weight per 1,000 grains, the presence of dodder and *Tylenchus devastatrix*; although we have had many samples tested, some as we receive the seed, others after we have cleaned it, so far we have only found *Tylenchus devastatrix* present in two samples, and one worm only in each case on particles of dirt in the seed before it had been re-cleaned by us. We are attaching great importance to the weight per 1,000 grains, as you will understand the heavier this is, the better quality the seed must be. It is generally accepted that the bolder grained the sample is the better the crop will be."

There seems a chance that some relatively harmless worm was mistaken for *Tylenchus*, but it must be accepted that the dealer shows by his letter that he believes the pest may accompany Provence seed, although he

thinks the risk is slight indeed and that it is largely removed by careful cleaning.

In general, high-class imported seed is, doubtless, safer to sow, as regards Tylenchus, than unselected South African-grown seed. But in the writer's opinion the best and safest seed for the South African grower to use, when he can make sure of getting it, is seed grown in this country in fields which are free of Tylenchus and other communicable troubles. Many farmers can supply their needs from their own farms, and others can purchase from farms which, by enquiry or personal inspection, they find to be above suspicion. Doubtless, too, some fully reliable dealers will be able to guarantee that what seed they offer was grown in clean fields. In this connection it may be mentioned that the leading Oudtshoorn merchants have been urged by the writer to exercise the most scrupulous care in buying seed for sale, and requested to caution prospective buyers in regard to the pest.

The infestation is most noticeable in the first crop of the season. Lands which appear to be very badly diseased then may seem to have recovered almost completely two months later. The explanation is that the pest makes most headway during the winter and early spring whilst the plant is growing feebly or not at all, and a great deal of the infestation may be removed with the first cutting. The second cutting of the season from a much infected field may appear to be quite satisfactory; but the recovery through the summer is more apparent than real, and examination will show that an increasing number of shoots are succumbing and that the growth of tops from a diseased stool is not nearly so heavy as from a normal stool. When spring comes again the gradual development of the trouble is likely to be only too manifest.

Fields which it is proposed to spare for seed production had best be inspected just after growth starts in the early spring. Infested stools then easily betray themselves by their sickly appearance and relatively feeble growth. The typically-infested stool is much swollen and stunted. Its surface is generally slightly wrinkled and more or less discoloured where the thickening occurs, and its pith is brownish. The worms are usually numerous in the discoloured pith and under the affected surface, but they are so minute that one can hardly make them out without a good magnifying glass. After the lucerne grows up the symptom of the trouble which is apt to catch the eye first is a blanching of the terminal leaves. In inspecting a field during the summer when the growth prevents the crowns from being seen at a glance, therefore, one should watch sharply for whitish or abnormally pale tops. White tops do not by any means necessarily indicate the presence of Tylenchus, but when they are seen one should examine the plant for stem swellings. Any part

of the stem, from its base to its very top, may be swollen in the characteristic way described above, and the thickening may extend for several inches or only for a fraction of one inch. Affected stems, as a rule, bear few or no seeds, but sometimes one is able to find swellings close up to and even beyond the side stems that bear seed pods. One should inspect all parts of a field, not a corner or a side only, as it is common for the infestation to be in more or less isolated patches. A grower who wishes to be well on the safe side had best avoid taking seed even from an apparently clean field that is only one or two years old if the field was grown from seed that was much open to suspicion, or if the field is on a site where lucerne formerly failed from an obscure cause. The young field might, perchance, be infected, but not to a sufficient extent to attract attention.

Oudtshoorn farmers are inclined to make light of the *Tylenchus*. They can afford to because their district has already become widely infested and because under their conditions of farming lucerne with ostriches the pest does not seem to work as great havoc as it has shown itself capable of doing under the conditions prevalent in some other districts. It will be many years, perhaps, before it is clear how serious a pest *Tylenchus* is, and meanwhile farmers will do wisely to avoid unnecessary risks of introducing it with seed, and also with manure, and those that have it in some fields but not others should as far as possible avoid acts which might carry infection into the clean ones.

Infested land should be planted to some other crop for a few seasons. Trouble should be taken to extirpate any lucerne that survives the ploughing, for odd stools that are left are likely to establish bad centres of infestation very quickly after the land is planted again to lucerne. In Europe the *Tylenchus* infests a great variety of plants besides lucerne, but it is said to change slowly from one plant to another. For this reason it probably does not matter much what are used as intervening crops. It would seem best for South African to plant what is known will do well after lucerne and can be utilised to the best advantage. Maize is likely to be the most common choice. *Tylenchus* is sometimes very destructive to rye, onions and other crops in Europe when these are grown year after year in the same soil; but it is not a pest that is much dreaded because crop rotation is ample to hold it in suppression. The fact that lucerne is there grown as a rotation crop, and not as a permanent one as most growers of it would have it here, is very likely the true explanation of its lack of importance as an enemy to this crop in Europe.

In conclusion, it is again notified that the Government Entomologist, Department of Agriculture, Capetown, and the Eastern Province Ento-

mologist, Grahamstown, will report by post on any specimens of lucerne, suspected of being infested by *Tylenchus*, submitted to them by growers. Several whole stools, cut off at the ground level, should be sent.

Agricultural Legislation.

FURTHER ACTS PASSED DURING 1909 SESSION.

THE following are two further Acts of interest to farmers which were passed by the Legislature last general Session and which have now been promulgated:—

ACT No. 26, 1910,

“To authorise the suspension of Act No. 33, 1896, in regard to the Tick Bird.”

1. The Governor may from time to time by Proclamation suspend the operation of Law No. 33, 1896, in regard to the bird known as *Buphaga erythrorhyncha*, the Tick Bird (red beak) or *Ihlalanyati*. Such Proclamation may extend to the whole of the Colony or to any specified part or parts, and may be revoked by a like Proclamation.

ACT No. 27, 1910,

“To make certain provision with regard to the purchase and disposal of lands acquired for Settlements.”

1. The sums paid by the Government, as shown in the schedule to this Act, for the farms mentioned therein shall be a charge upon moneys borrowed under the authority of Part V. of the Agricultural Development Act, No. 44, 1904.

2. Nothing contained in Part II. of the Agricultural Development Act, No. 44, 1904, shall be deemed to require that the procedure therein indicated must be followed in order that any rural land purchased for the settlement thereon of persons of European descent may be paid for out of moneys borrowed under Part V. of the Act, but such moneys may be expended in the purchase of land for the said purpose, in whatsoever manner the land may be acquired.

3. Any lands purchased by the Government under the authority of this Act, including those mentioned in the schedule, may be laid out and disposed of by the Government for the purpose of placing settlers thereon, by lease or by sale, in such manner and upon such conditions and with such reservations for commonage and other public purposes as the Government may determine.

§4. Section 68 of the Agricultural Development Act, No. 44, 1904, is hereby repealed.

SCHEDULE.

Farm.	Sums paid.		
	£	s.	d.
Portions of Eendvogel Vlei, Klip River County ..	7,519	3	0
Dubbelrecht, Vryheid District	2,802	13	10
Hartebeestbult and Vlei Plaats, Vryheid District	3,749	1	6
	<hr/>		
	£14,070	18	4
	<hr/>		

The Position of East Coast Fever.

OUTBREAKS DURING FEBRUARY AND MARCH.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 20th February to 19th March:—

Weenen Division.—Outbreaks on the farms “Bushman River Mouth,” “Town Lands.”

Ladysmith Division.—Outbreaks on the farms “Alexandria,” west of main line, “Nooitgedacht,” west of main line, “Vlaaks Plaats” (sub-division of “Georginia” and “Vlaaks Plaats”), “Gigt Kop” (sub-division of “Doorn Kraal.”)

Utrecht Division.—Outbreaks on the farms “Klipfontein,” “Palmietfontein.”

Krantzkop Division.—Outbreaks on the farms “Krom Vlei” (sub-division of Varken’s Vlei), “Lucky Hall” (sub-division of “Luck’s Hill”).

Lion’s River Division.—Outbreaks on the farms “Hopedale” (sub-division of “Weltevreden”), east of main line, “Selsby” (sub-division of “The Dargle”), west of main line, “Newstead” (sub-division of “Geelhout Boom”), east of main line.

Camperdown Division.—Outbreak on the farms “Spring Valley,” “Lloya Dale.”

Richmond Division.—Outbreaks on the farms “Cliffside” and “Sunnyside,” “Misty Home” (sub-division of “Driefontein”).

Ixopo Division.—Outbreaks on the farms “Lot 14,” “Location No.

5," "Stuartstown Commonage," "Erskine," "Welcome Home," "Mission Station on Umtwaluni Falls."

Bergville Division.—Outbreaks on the farms "Mt. Hilda" (sub-division of "Honger's Poort"), "Emmadale."

Lower Umzimkulu Division.—Outbreaks on the farms "Nestor," "La Trappe," "Patwa's Location," "Oldenstaad," "Attenburg," "Oldenstaadt," "Marburg Settlement," "Freedwald."

Umgeni Division.—Outbreak on the farm "Portion of Langehoop."

Umvoti Division.—Outbreaks on the farms "Harden Heights Wattle Co." (sub-division of "Houghton"), "Burrups" (sub-division of "Welverdient"), "Honeystone" (sub-division of "Hartebeest Vlake"), "Burleigh," "Bridgeford" (sub-division of "24"), "Normanby" (sub-division of "Vogel Vlei"), "Louis Dale" (sub-division of "Driefontein"), "Boschfontein," "Excelsior" (sub-division of "Stonehenge" and "Bloemendaal"), "Stonehenge," "Olivefontein," "De Rust" (sub-division of "Rust"), "Mountain View," "Redgates" (sub-division of "Mispa"), "Mistley."

New Hanover Division.—Outbreaks on farms "Sherbrook" (sub-division of "Camel Hoek"), "Mooi Plaats," "Clan Syndicate" (sub-division of "Jepson's Vlei"), "The Avenue" (portion of "York Settlement"), "Welverdient."

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of the Victoria County, Vryheid, Ngotshe, Babanango, Paulpietersburg, and Umsinga.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

NOODSBERG ROAD.

At the annual general meeting of the Noodsberg Road Agricultural Association, the President (Mr. F. Reiche, J.P.), delivered the following address:—

"Gentlemen,—I have the pleasure of presenting herewith my annual report at the close of the twelfth financial year of our Association.

"Unfortunately the state of the country did not permit holding a show last year. I should be glad if the altered circumstances would encourage us to hold one this year. It would no doubt bring fresh life into our Association and our meetings.

"Our principal thoughts during the year centred in the East Coast

fever, which, after all, entered the district and spread from farm to farm, despite all precautions. One remedy after another has been tried, but all in vain, and whether the Otto cure or preventive which is the present straw held out to the farmer will prove of any more use in the end than all the other inoculations and remedies remains to be seen. However, let us hope so, although we have no reason to feel confident as yet.

"The mealie crop last year was a good average one, and with the large areas planted nowadays, the increase from year to year is considerable. The Natal Cooperative Mealie Growers' Union did good work in exporting, and the prices obtained were most satisfactory in comparison to local prices. Farmers are well advised to join the Union for the purpose of disposing of their crops. A great advantage is the advance of 7s. 6d. per bag on the mealies which is paid to you as soon as they are shipped.

"The kafir corn is losing much favour in the district, as the prices for the last season were low and unremunerative.

"Black wattle growing remains a good paying industry, and an enormous acreage is yearly added to the existing plantations throughout the Colony. There is no branch of farming more in general favour at present, I believe.

"I have much pleasure in congratulating the Wartburg Sweet Potato Growers' Association on its energy and well-deserved success. The establishment of a starch factory in the district, I understand, is well assured, and there is no reason to doubt its ultimate success. Sweet potato growing got a fresh start through this Association, and a payable-unlimited market will be provided for this article. With suitable soil no crop does pay better, and it is just a crop for the small farmer.

"In concluding, I thank our secretary and treasurer for the work he has done, and all the members who have taken an interest in our Association, and I ask you to continue supporting the Association."

The Treasurer's report was as follows:—

"Mr. President and Gentlemen,—I have much pleasure in submitting to you herewith balance-sheet for the twelfth financial year ending to-day, and closing with a credit balance of £323 19s. 4d., which is again a few pounds less than last year's balance. You will notice that the expenditure during this year has been exceedingly low, but I am sorry to state that only the trifling sum of £7 15s. subscriptions has been paid in. Members should bear in mind that unless the subscriptions are paid regularly it is impossible to keep the finances of the Association in a healthy state.

"The balance-sheet has been duly audited by Mr. W. Misselhorn, and I trust that it may be found in order."

Experiment Farm Reports.

CENTRAL EXPERIMENTAL FARM.

Of work at this Station, the Manager, Mr. A. Reid, reports as follows:—On the 19th January I resumed duty after an absence of three months, having had enteric fever. A rainfall of 5.82 inches was recorded in January, and for February 7.48 inches.

A large area of root crops has been planted in good condition, and gives every promise of doing well.

The ground received a dressing of 200 lbs. super. and 100 lbs. muriate potash per acre, and the Swedes an additional dressing of farm-yard manure.

The process of ridging and planting was done in one operation. The varieties comprise:—

Swedes.—Goliath Swedes, Kangaroo, Garton's Model Swede, Carib's Prize Winner, Magnum Bonum, Kinaldiss Improved Swede.

Turnips.—Purple Top Aberdeen, Green Top Aberdeen, Devonshire Greystone, Green Globe, White Globe, Purple Mammoth.

Carrots.—Altringham Long Red, James' Intermediate, White Belgian, St. Valery.

Fifteen acres of rape has been put in, part drilled and part broadcasted. An area of buckwheat has been planted, as also a section with peas.

A mixture of barley rape, mustard, chicory, thousand-headed kale, and rib grass has been planted in the mallee drills, and broadcasted on a strip on the vleis.

The weather has been unfavourable for hay cutting, and 200 bales only have been carted to the sheds. Japanese Millet, Phalaris, and Paspalum has been cut, baled, and secured.

In the beginning of February 13 native convicts were received, and have proved satisfactory.

Potatoes are at present being harvested.

On January 24th a troop of horses, numbering 34, were sent to Giant's Castle Game Reserve to avoid horsesickness.

Sufficient native labour is now available. The troop of mules are healthy and in good working condition; the only casualty to stock in this branch has been the death of an eland.

ALEXANDER REID,

Farm Manager.

4th March, 1910.

SHEEP.

The Wool Expert, Mr. J. J. McCall, reports at considerable length on this subject for the two months under review. As most of this is matter of considerable interest, his remarks are published in full, as follows:—Owing to the absence of students from the farm, I have not been able to work the flocks as I would otherwise have done, but still I have got through whatever work was absolutely necessary with the ordinary farm labour. I took the rams out from the various ewe flocks on the 25th of January, they having been running together for two months. The lambing will thus start on the 23rd April. Whilst putting the sheep through the yards I cleaned and trimmed them, as the soft green grass was showing the usual effects. During the month the maggot fly was very troublesome and many of the rams suffered in consequence. I had to fall back on the old-tried preventative "Stockhalm tar," although I, as a rule, deprecate its use on wool. The month has been a very trying one on account of the excessive rainfall; but the Lincolns and Merinos have done well, considering the rough time.

The netting for enclosing the upper portion of the farm for sheep grazing is now to hand, and the work of erecting it will be taken in hand at an early date.

I am at present erecting a drafting yard which, although made from rough bush stakes, will obviate all the usual hand-catching and dragging which is, as a rule, the custom in South Africa. I will be able to draft a flock into three lots in the one operation, and also provide a suitable pen for dosing and branding without the necessity of catching each individual sheep. It is my intention to dose all the sheep with the blue-stone drench recommended in the late "Transvaal Agricultural Journal," as many of them look "wormy."

On the 24th of January Mr. J. C. Walker, a late student, arrived to assist me in my work with the sheep, he being desirous of obtaining additional experience in return. During the month I gave a demonstration in the handling of wool at "Uitzicht," Greytown district, which was fairly well attended, but rain again was rather against a large gathering. I took Student Dumat with me to give him a further insight into practical work. The merino rams which were on lease to Mr. Blaker, of Estcourt, were returned during the month, and looked very well indeed. We have been able to fill a few orders during the month for rams and ewes at satisfactory prices for both buyer and sellers. I have still a few pure-bred haired Persians, and one or two cross woolled Persian-Merino rams which I could spare. The deaths for the month were slightly under half per cent., but if the weather does not take up soon I anticipate a rather heavy mortality during the incoming month. Since the beginning of the year until the time of writing, I have been able to

secure four hungry-looking kafir dogs, which used to give the sheep a miserable time at night, besides killing several of them. I anticipate further success in that direction. February has been a very trying time for the sheep on this farm. There has been rain on 23 days during the month—one week totalling 7 inches, which included a fall of almost 3 inches in two hours. The later storm was the cause of a considerable portion of the boundary fence along Reitspruit being washed down, but I have now arranged to have the damaged fence re-erected a little further out from the spruit on the rising ground, to avoid a repetition of the damage. The new sheep-drafting yards are complete with the exception of the gates, which I will have made, and hung during the incoming month. The drench which I have used on the sheep does not appear to have had any beneficial effect in freeing them from intestinal and tape worm. To make sure of the fact, I took six of the worst of the lambs and kraaled them for 25 hours without food or water. I gave each of them 40 c.c. of the bluestone solution (made up of $1\frac{1}{2}$ oz. sulph. of copper to 2 gallons of water). This being an exceptionally strong dose, I anticipated some mortality afterwards, but none occurred. After drenching I left the animals for another three hours, when I administered 3 oz. of warm castor-oil to each of them. I had them in a small clean, pen and watched for results for a further four hours, but I failed to find any parasites in the excreta which they passed. I turned them out into the paddock in the evening. On the fourth day they were still alive. At your request, I forwarded one of those lambs to the Chief Veterinary Division for examination.

In this connection, it may prove useful to remark that the lambs which were dropped prior to September, are all strong and healthy, whilst the spring lambs have been unthrifty and show lack of stamina. I have arranged it this year that the lambing will be over by the end of June, and I anticipate more success in rearing the young stock than I am having at present. We have a fairly varied assortment of types of sheep on this farm, but, as I anticipated, none of them have approached the Merino for hardiness and adaptability. They were barely twelve months old when they were received here last August—most of them had not cut their 2 teeth—and they had just been imported. I have not had a death amongst them since the 21st of December last, and there are just under 500 of them. I have come to the conclusion that on this farm the sheep which will prove most suitable will be a small-framed thrifty animal, and I think I can evolve just such a type out of the Merino ewes which we now have.

The Lincoln ewes have also come through the trying time of the past two months, very creditably, and I am convinced that 90 per cent. of the flock have undeniably splendid constitutions. I have been agree-

ably surprised at the way they have held their own since their importation.

The Hamps are giving me cause to have considerable doubts as to their suitability for veld like Cedara, they don't seem to do well at all, although I have given them every opportunity to do so.

Although the flocks are comparatively free from ticks, it is my intention as soon as the weather improves to resume dipping until the colder weather intervenes to render the practice undesirable. I am hopeful of avoiding the ravages of heart-water during the incoming winter by overcoming the "Boat-tick," which causes the evil. While on the subject of dipping, I may here remark that on reading my report in the "Agricultural Journal" for December last, I was struck by the unhappy method in which I expressed myself when speaking of Cooper's Powder. I meant to convey the idea that it was an article which, while perfectly safe, used according to directions was apt to have unlooked-for effects when used at a much higher strength than that given in the "*instructions for use*," which are on every packet. I have yet to express an opinion on its effects when used at close intervals of time, and I regret the circumstances that have arisen to prevent my completing experiments which were being conducted with that end in view, with other dips as well as Cooper's.

As the shearing season for Natal long wools (combings) will be over by the end of the approaching month, it is my intention to put before you a review of the wool season, in so far as it concerns my work, and the endeavours of the sheep farmers to meet altered conditions. Between now and the commencement of next wool season, I shall, with your permission, be glad to classify and cull ewes and rams for any farmer who desires my help, so I will feel gratified if those who intend to avail themselves of my services will give me fairly long notice of the time most convenient and suitable for themselves, so that systematic arrangements may be made.

ORCHARD.

The Government Orchardist, Mr. C. B. Parsons, reports as follows for the month of January:—

This month has been the busiest in dealing with fruit yet seen, Revenue amounting to about £39, which figure constitutes a modest record for the orchard. I am afraid, however, that the money making end is now in sight for this year, as only some few peaches and late plums remain. Fruit has been marketed at Johannesburg, Durban, and Maritzburg. The Johannesburg prices give very poor returns, and I find the Durban market by far the best. I have succeeded in filling with fruit practically all bottles in stock. A distinct improvement is to be noticed

in evaporated fruit, especially with plums. The peach crop this year is considerably smaller than last, nor do the fruit compare as favourably. I shall have my little surplus for drying purposes. The assistance of students has been much missed this year, as with a staff only of unexperienced kafirs, it is difficult to make all things work smoothly. I have done my best for the College, and have given the Matron a busy time, supplying nearly 800 lbs. of fruit for jam making.

WINKEL SPRUIT EXPERIMENT FARM.

This station having been made the headquarters of the School of Agriculture while certain alterations and improvements were being effected at Cedara, a large amount of work has been got through, of which the Manager, Mr. W. J. Johansen, reports as follows:—

Winkel Spruit Experimental Farm,

March 9th, 1910.

Although we were very late in commencing our planting this season, mostly all crops, including a manure section of chicory, were in by January 12th, and owing to the favourable growing conditions of the weather since most of the crops have made good headway, and some good fields should be obtained. In January 3.26 inches of rain fell, and in February 3.38, with the temperature ranging from 80 to 85 in the shade. If one could depend on getting the same weather conditions each season it would be far better to plant maize here from the 12th December to January 20th, as the grub is then finished, and the young crop has every opportunity of making good headway.

Early in February 19 students, yourself, House Master, Biologist, and carpenter were stationed here and some useful work has been carried out.

The students, in addition to receiving daily lectures, have been busy thinning and transplanting maize, planting cane and bananas, ploughing, harrowing, making roads, clearing bush, surveying, cleaning crops, pulling down and re-erecting students quarters fixing up maize-crib thinning out banana plantation, planting trees, etc.

The Inanda varieties of cane which were removed to the vlel in September, 1908, made excellent growth, some of the varieties maturing at 14 months. Owing to very heavy rain in September, and during the only break we had from cane-cutting, we were unable to plough the land set aside for these varieties, and consequently they were not planted out in evaporated fruit, especially with plums. The peach crop this year is again until the end of December, and this was unfortunate, as there is

not much doubt that cane planted early in September has a marked advantage over canes planted later in the season.

Two varieties imported in February, 1908, have been cut the second time and also planted on the vlel.

The following are the varieties of cane now planted here, excluding Uba, Lorisier, and Green Natal:—

Num'ers.	Varieties.	Colour.	No. of Rows	Habit.
1	Antigua B 15	Greenish Yellow	1	A ching
2	" B 95	Brown... ..	3	Erect
3	" B 109	Pink	9	Semi Erect..
4	Honolulu Rose Bamboo	Riboned Brown and Green	9	Erect.
5	Queensland No. 3	" Green and Yellow	1	Erect.
6	" No 2	Dark Red	8	A ching.
7	Demerara D 95	Brownish Yellow	5	Erect
8	" D 626	Light Brown... ..	3	Semi Erect.
9	" D 145	Yellow	2	Arching.
10	" D 109	B ight Brown	7	Erect.
11	Honolulu Lahamer	Riboned Pink and Green...	1	Semi Erect.
12	Home	" Brown and Yellow	5	Erect.
13	Demerara D 95	Brownish Yellow	14	Erect.
14	" D 74	Green... ..	23	Erect.
15	Egyptian Nos. 16, 17, 18	Not determined, not yet cut	—	—
16	Swinga	Green, very much like Uba	Uba	newly planted.

The D 74, which is a green cane, has made splendid growth since received in 1908, and from a few sets 23 lines have now been planted. This cane is much like Uba cane in colour and appearance, only much thicker, and gives every evidence of being a good ratoon.

A small lot of this cane should be available for distribution next season, but not until about November or December.

The Egyptian canes are now making excellent growth; and will be ready for transplanting in September.

Several varieties of Bamboo were obtained and planted out last May, and, with the exception of Bambusa Large Green, all are doing well.

Varieties are Bambusa Mitis, Bambusa, Flexnosa, Bambusa Simoin B-a Whipstick, B-a Mitake, B-a Large Green, B-a Swochiki, B-a viridis glaucescens, B-a guilioe, B-a fortunii, B-a variegata, and B-a dendrocalamus membranaceus.

Owing to an oversight the results of the Distance of Planting Sugar Cane were not forwarded to you with the manure results, and the following table again proves the better results are obtained from the closer plantings.

Plots.	Area.	Feet Between Rows.	Feet Between Sets.	Cut January, 1906.		Cut Sept., 1907.		Cut October, 1909.	
				lbs. per plot.	tons per acre.	lbs. per plot.	tons per acre.	lbs. per plot.	tons per acre.
4 B		5 ft.	3 ft.	lbs. 948	tns. lbs. 28 1,880	lbs. 1,481	tns. lbs. 48 860	lbs. 1,663	tns. lbs. 49 1,780
73	1	"	"	4,120	30 1,800	4,513	31 1,695	5,584	41 1,760
74	16	"	4 ft.	4,811	36 165	4,731	35 965	5,255	39 825
75	of an	"	5 "	4,880	36 1,200	4,253	31 795	5,015	37 1,225
76	acre	"	6 "	4,954	37 310	4,312	32 815	4,829	36 1,125
77	2	6 ft.	3 "	5,853	36 1,162	5,378	33 1,225	6,128	38 600
78	28	"	4 "	4,123	25 537	5,044	31 1,050	6,072	37 1,900
79	of an	"	5 "	5,001	31 512	5,169	32 612	5,622	35 235
80	acre.	"	6 "	4,921	30 1,512	5,096	31 1,700	5,662	35 775
81	4	7 ft.	3 "	5,853	31 920	6,198	33 628	6,191	33 553
82	48	"	4 "	5,500	29 1,125	5,497	29 1,092	6,178	33 413
83	of an	"	5 "	5,545	29 1,609	5,228	28 201	5,106	27 889
84	acre.	"	6 "	4,859	26 239	4,518	24 568	4,950	26 997
4 B		"	3 "	1,062	22 1,666	1,149	24 1,407	1,130	24 590

Mules are continually ploughing and are keeping in good condition.

Although for a couple of months labourers were hard to get, there are an abundance to be had at present.

N. JOHANSEN,

Manager.

In selecting brood sows, always choose those whose mothers have been profitable breeders.

Pigs from mature sires and dams grow faster and feed better, everything else being equal.

Any breed of chickens will do on the farm, but it is not a good plan to have several breeds around. Cocks changed once a year is a good plan.

At the present day more than 50 publications are printed for the poultry industry alone, and more than a thousand poultry shows are held yearly in the United States and Canada together. Canada has taken a stronger hold of market poultry than has the United States because the fattening of fowls for the export trade has been fostered and helped by the Government till the quality has been wonderfully improved, and it has become a great money-making adjunct to the farm.

Forestry Reports for January and February.

AFFORESTATION.

In the absence of the Chief Afforestation Officer, his Assistant, Mr. T. R. M. Pole, reports as follows:—

During the month under review, like the last, the work that has occupied most of the available labour has been the felling of burnt *Eucalyptus* plantations to allow of free copicing. The plantation running along the Eastern Boundary on Winter's Hill has been cut down.

Stripping operations have been pushed forward, and every hour of sunshine taken advantage of, but drying has been a very slow process, owing to the amount of damp weather, which was almost continuous from 10th to 31st, the total rainfall being 5.82. The Bark Cutter (A. Collins' Patent) was got into working order, driven by the "Gardener" Oil Engine, and 8,603 lbs. of bark were cut, bagged, and consigned to Messrs. Reid & Acutt, Durban. Packing of this consignment had to be done by hand, which was very unsatisfactory, but a Collins' Patent Packer has now been secured, which will greatly facilitate operations in this direction in future.

The revenue realised from Nursery sales during the month was £37 4s 9d., against £26 2s. 1d., for the same period in the previous year. These figures are exclusive of Bark sales.

General nursery work has been carried out in spare time, and some 17,610 *Cupressus lusitanica* have been pricked off and a large quantity of stock prepared for show purposes.

Some large trees were planted in Farm Poultry runs to provide shade for the birds.

The collections of trees on either side of the C. A. O.'s house have been hoed and all weeds removed. *Cynodon* grass is being laid down between the trees with a view to forming a lawn in the near future, which, when established and frequently mown, will cause these spots to be attractive features on this section of the Farm.

Forester Foster reports that he has now got the Hydraulic Ram into working order, and it is giving satisfaction. His work has been hindered by wet weather, having had 5.78 inches during the month; he has, however, contrived to get the sawing completed, boxes made, and some 3,000 transplants established in boxes. Hoeing operations at this Station have been pushed forward, but have been hindered by the truancy of the natives.

CONSERVATION OF CROWN FORESTS.

The Chief Forest Officer, Mr. G. H. Davies, reviews work in the Crown Forests during February:—

Numerous losses by river floods during February point the moral with which I concluded my report for January; sudden floods are the very signal feature of a disforested country. The losses included several lives of Europeans and natives, quantities of stock and agricultural produce, bridges washed away, and much damage all over the Colony. The Ingungwane River, which is a boundary of Natal for some distance, rose to its greatest recorded height, and drowned two members of the Police; a little stream—the Ixopo—washed away a main road bridge of many years' standing; and Forester Garland reports enormous quantities of pumpkins, with bodies of sheep and goats, and even of natives, seen in the swollen Unkomaas. Similar reports come from many forest stations, and Forester Tustin states that the Impetyene, which flows through the forest, carried big logs and quantities of small wood into the adjoining location, where the natives will now have plenty of fuel in consequence. He also reports that lightning struck about thirty yards from the Forest Lodge and made a furrow ten yards long, an alarming experience. I know a spot, on a ridge above, where a similar furrow was made about eighteen years ago, but that was much further off. At Ngomi, Forester Foster reports over ten inches of rain between 26th January and 26th February, but I believe that is nothing to the fall in some other places: the meteorological returns being only for the calendar month.

Natal's greatest need is reservoirs; and of the two kinds of these—forests and dams—the natural is infinitely the better. The artificial is desirable too, but it is liable to give way under the strains inseparable from a disforested surface, and all dams should have their catchment areas densely wooded. In fact, the two kinds of reservoirs should go together and be complementary; and the consideration which applies to artificial reservoirs applies also to every river and little stream in the Colony. We have alienated a great deal too much of our river banks without precautions for their reboisement, and the primary source of agricultural wealth rushes spoil-laden into the sea destroying as it goes. Some day we shall admit the necessity for a forest law applicable to all lands, public and private, and backed by sufficient means to enforce protection for the surface of the country and all it bears.

The result of the analysis of the Salunwana bark mentioned in my last report is that it contains 9.09 per cent. of tannin. Such is, of course, no final valuation of the bark, as much richer sources of tannin make very poor leather. In America the bark of the hemlock-spruce, which yields less than the above, is largely used for its excellence; and the Ngomi waterboom may make a superior leather for all we can tell.

Practical tests are needed for this and many other things: only yesterday I pointed out to the District Engineer, Durban, that waterboom and other native timbers tried as railway sleepers should be as well seasoned for comparison with the imported article.

Mr. C. Phipson has taken charge of Bulwer forest district during the absence of Forester Purser, and has been trenching several insecure beacons at the Xotsheyaki. Others must await the return of the Forester to locate. Mr. Surridge having retired in order to be free to visit the Old Country, Mr. J. A. C. Auld takes charge of the Upper Umkomaas district. Forester Auld will doubtless take as much interest in his new trust as in bees and other things, and I expect much assistance from him.

Forester Fernando has been replacing failures in his avenue of deodars from surplus stock. Field mice were the cause of these failures, and they and buck have also damaged the *Pinus Canariensis* planted on a spur of the Emkazeni; but a large proportion of these have coppiced freely and are vigorous in spite of hostile treatment. The experimental sowing of Pindron--*Abies Webbiana*--in 1907, with seed supplied by the Forest Department, Punjab (Lahore), has proved a failure; only one seedling remaining, in a condition, apparently, of suspended animation. Forester Chilvers has sent you seed of Black Stinkwood: the scarcity of these miniature acorns is probably due to the free coppicing habit of the species. Forester Tustin has been transplanting yellowwoods, and Forester Foster has planted waterboom in place of those felled for building the 'Ngomi Police quarters. Forester Tarboton has patrolled up the coast of Zululand, at the risk of fever, which is very bad just now. Forester Household has been on special duty to the plantation at Nqutu, which he finds to have been badly treated: heavily cut where thinnest, whilst parts are left crowded, and mealie gardens made inside it. Forester Mason, in a lengthy report of great special interest, mentions noticing a wattle plantation grown by a native, and suggests that similar enterprise should be encouraged in native locations. As the natives are responsible for the destruction of much bush I heartily concur.

Several Foresters report observation of game of all kinds, especially bush-buck. Forester Tustin seized a steel trap of Brobdignagian proportions in the Ravine forest near the Umtamvuna, and would have been caught and had his leg broken by it if it had been set. He now has it on exhibition at the Impetyene Forest Lodge. Forester Symons is now back at Giant's Castle, and reports that the 37 horses from Cedara are all well. He has acquired a good bull terrier, which, he hopes, will account for jackals. Forester Fernando reports the successful prosecution of four natives caught poaching in the Xaliavina forest; one being fined £5 and the others birched.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

POULTRY-KEEPING is, and will remain, one of the most profitable undertakings of its kind, just because it can be exactly and easily quite the reverse.—JAMES SHACKLETON.

MAIZE AND MOISTURE.

Each corn plant in the field is a pump, and the larger the leaf surface on each stalk the greater the capacity to pump water from the soil into the air. In southerly latitudes the corn plant has a tendency to develop a larger leaf surface, and unless thinly planted is liable to exhaust the soil water before the seed is perfected. This is one reason why it is so important to plant varieties that develop the largest or best filled ears in proportion to the thickness of stems and size of the leaf.—H. R. HILTON.

LIQUID MANURE.

In applying liquid manure it is always necessary to use it in a highly diluted state; even so much diluted that it would run off perfectly clear might be of sufficient strength for all purposes. The danger lies in using if of too great a strength rather than diluting it too copiously. It has been found in practice when a heavy rain had filled the tanks at a season when there was but a very small supply of manure, and the dilution was certainly not less than a hundred times weaker than ordinary liquid manure, that the use of this weak liquid upon a plot of corn fodder gave a wonderful stimulus to the crop, and the sudden change to an intensely dark green colour proved that it was sufficiently strong, although from its colour and freedom from smell the source of the liquid would not have been suspected. But it should be borne in mind that it is easy to injure a crop by using a too concentrated liquid manure.—HENRY STEWART (*"Irrigation for the Farm, Garden, and Orchard"*).

CARE OF PIGS.

If kept in dry lots, or fed in pens, plenty of trough room should be provided, and at least twice a day the hogs should have as much clean water as they will drink, and practical men know that this is no inconsiderable quantity. Whatever the feed may be, it should be given in such a manner that they will be forced to eat as little filth as possible, and if

corn can be fed on a clean floor, or ground having a sod, it is an excellent plan. But when the animals to get their food must swallow as much mud and manure as grain but poor results can be expected.—F. D. COBURN (*"Swine Husbandry"*).

NUTRITIVE PROCESSES IN THE SOIL.

The absorption of nutritive matter by the soil is a phenomenon of universal occurrence and widest significance as influencing the conditions of plant growth. Its manifestation is among the most common processes of Nature; yet not until within the present half century was it fully recognised or appreciated in its bearing on plant nutrition. Solutions, as a result of our modern irrigating methods, are known to part with their solid constituents on passing through any considerable quantity of soil. They are thus disseminated more evenly throughout the top-soil, and are left there on deposit, as it were, to be drawn upon by the growing vegetation, and hence it is that irrigation improves the mechanical condition of soils and makes them the more readily subservient to the agriculturist.—LUTE WILCOX (*"Irrigation Farming"*).

LIME.

Besides its value as a medicine in curing soil acidity and its chemical aids in the preparation of plant foods, lime is a valuable agent in granulating compact clays that the water and air may circulate with greater freedom. Put some fine clay in two milk bottles filled with water. Shake the bottles to show a muddy or cloudy appearance. Add a little lime water to one, and note how much sooner the clay particles will settle to the bottom leaving the water clear. The action of the lime assembles the clay particles into little masses like the curdling of milk, and these gaining weight soon settle to the bottom. The lime in the soil acts similarly to assemble a number of soil particles into one mass which the water films surround as if it were a single soil grain. Lime makes a clay soil look and act like a loam soil.—H. R. HILTON.

COMBUSTION AND INCUBATION.

Animal heat is formed by the chemical union of oxygen and carbon. The oxygen of the air inhaled into the lungs is carried by the corpuscles of the blood into the organs of the body, where, by uniting with the carbon of the waste or decayed tissues, carbonic acid is formed. The latter is conveyed by the same channels back to the lungs to be exhaled, and a fresh supply of oxygen is received. Wherever this chemical union takes place, heat is generated in proportion to the activity of the chemical action, and the quantity of the necessary ele-

ments present. In an egg all the elements necessary for the development of the chick, except oxygen, are already present in sufficient quantities in the white and yolk. Oxygen enters through the pores of the shell, and from the very first day oxidation takes place, although in the early stages of incubation, probably very little oxygen is used, as the chemical action set up by the heat of the hen's body is at first directed mainly to the building up of the structures of the embryo, the breaking down of heat-generating process of burning not being perceptible.—J. H. SUTCLIFFE (*"Artificial Incubation and its Laws."*)

Potatoes.—To grow common potatoes under irrigation, with success, needs caution and judgment. As the quality of the tubers depends greatly upon the supply of water, judiciously regulated with regard to the character of the soil, some care must be exercised as to the quantity. Upon light soils the water is given only at intervals of nine or ten days, and upon heavier soils, which are more retentive, fourteen days elapse between the waterings. As soon as the soil is sufficiently dry after watering, the surface should be cultivated, which will cause the moisture to be better retained. A system of drills, or of beds slightly raised, is used for this crop, the water being given in broad, shallow furrows, made with the hoe at the time of cultivation. When the plants nearly cover the ground, as they should do at the time of blossoming, the final watering is given. No further cultivation should be given after this period.—HENRY STEWART (*"Irrigation for the Farm, Garden and Orchard."*)

Bran is a good element in the poultry ration.

Don't try to put fat on a hog that hasn't the bone to support it.

Farm manures are not only a by-product, but they are usually a waste product.

Roots and vegetables or clover hay generally have a beneficial effect upon the digestive organs of the hog.

Angora goats cannot thrive if crowded into a small space, hence should not be kept in large flocks on small farms.

The chicken business is usually looked after by the farmer's wife, but it would pay the farmer himself to look into the matter a little.

Exchange Reviews.

WHAT OTHERS ARE THINKING AND DOING.

MR. ALEX. C. BENNETT, of Dorrie, New South Wales, communicates to the *Agricultural Gazette* of that State the results of experiments which he has made in connection with the electrifying of seeds prior to sowing with a view to hastening their germination. He says:—"Being interested in a paragraph which appeared in the *Agricultural Gazette* on electricity as applied to seeds, I did a little experimenting with a small dry battery, as follows:—Measuring equal quantities of lettuce-seed from the same packet, I prepared a small bed and divided it with a trench in the middle. On one side I planted the seed in its natural state, and on the other seed which I had previously electrified—by placing on a damp cloth on the plate attached to the battery. The time I gave was four minutes, applied at medium strength. The result so far has been very satisfactory. The electrified seed germinated well and beat the non-electrified by seventy-two hours. The plants look strong and healthy, and there is every indication that they will maintain the lead they have gained. Peas treated by electricity have germinated from twenty-four to forty-eight hours sooner than those not treated. I am following the experiments up and applying electricity to young plants by means of a damp cloth laid on the top of them, and causing the current to pass through them by means of this conductor."

Protection of Orchards against Frost.

An article in a recent number of *The Western Fruit Grower* describes the methods in vogue among fruit-growers in California for the protection of their orchards against the affects of late frost. The principle of the methods of protection in vogue is that of heating the air of the orchard; and the first experiment in orchard heating is described as follows:—In the early spring of 1907 three of the growers made the first attempt of preventing the loss of their fruit by frost. Orchard heating had been done in the California orange groves for several years. In these orange groves, however, it had not been necessary to raise the temperature but a degree or so, and even if more was necessary, the temperature would not get so low to start with, and, of course, was much more easily handled. These three growers secured some sheet iron buckets from California, and, nothing being at hand to burn in these pots but kerosene, that was used. Kerosene cost them 7½d. per gallon. These growers successfully fought five nights of frost and were successful in saving their crops. They succeeded in keeping the temperature in their orchards around the freezing point, which, however, is perfectly safe for fruit of this kind. The danger point is 28 degrees F., and below.

The lesson of 1907 was very valuable to these growers. The fact that the crops could be saved from frost had a very good effect on land values, for had this not been done these values would have dropped considerably during that season and since. During the summer and fall of 1908 and all during the winter every grower throughout the valley was testing heaters. With the beginning of March, 1909, the orchards were supplied with at least twenty-five different makes or designs of heating apparatus. Some burning oil, some coal. The pots used for heating the orchards are locally known as "smudge" pots. Three or four varieties of oil pots are used. The first brought to the valley very much resembles a ten-pound lard bucket, only made of sheet iron with air-vents of about one-half inch in diameter cut at the top. Another resembles an ashpan from a range with a sliding cover, to which is attached an apron. With the latter pot the fire surface can be regulated by sliding the cover and any desired fire surface from five to 175 square inches obtained. One hundred of the former pots are used to the acre, and they burn about a quart of crude oil per hour. Fifty of the latter are necessary, and 40 inches heating surface will give about the same heat furnished by the other pots and burn about the same amount of oil. If this latter pot is burned wide open it will consume one gallon of oil per hour. Only in extreme cases would it be necessary to do this. The coal pot, it is claimed, is much cheaper to burn and far cheaper to store supplies for than the oil pot. There are more than a dozen different patterns which were used the past season, and we shall not go into detail as regards to all of them. One of them, much used, will burn about three hours with a charge of twenty pounds of coal. Wire baskets have also been used for coal burners. In fact almost every conceivable kind of an iron bucket or basket has been used for this purpose. The greatest objection to the use of coal is the cumbersome work of refilling the pots, as this entails much labour.

Describing how the pots are fired, the *Fruit Grower* says:—To light the oil pot a small piece of waste is dipped in the oil and hung over the side of the pot, extending into the oil. A torch is carried along and the pots are lighted as swiftly as the lighter can run from pot to pot. Another system used for lighting oil pots is by sprinkling over the oil a few drops of gasoline; the torch applied to this gasoline it instantly ignites. Caution must be used with this, however. It is hardly safe for the same party to carry the gasoline applying it to the pots and lighting them also. The safest way is for a different party to apply the gasoline and the light. If it is desired to extinguish the fire any time after lighting a sheet of iron, which is used as a cover can be placed upon the burning pot and the fire smothers out. In the use of coal pots it is necessary to supply yourself with a sufficient amount of good, dry kindling wood and

so placed in the pots that it will secure a quick fire. Oiled waste or rags are placed under the kindling and the coal placed on this. If you wish the best of success with coal pots, we advise a small amount of kerosene poured over the kindling wood when the pots are lighted. While it is much better if all orchards in a community will smudge, it has been demonstrated here in instances that even where there is no smudging done in miles around the fruit of a single orchard or tree can be saved from frost.

Pineapple Cultivation.

Mr. Mariano M. Cruz, the agricultural assistant attached to the Philippine Bureau of Agriculture, discusses in a recent number of the *Government Agricultural Review* the present status of pineapple growing in the Bataan and Bulacan Provinces of the Philippine Islands. After reviewing the present methods of cultivation in the Islands, he offers some useful suggestions with a view to improving the present methods. He points out that, in the way of cultivation, hoeing can be done three or four times a year, enough to stir the surface of the soil around each plant to hold the moisture as well as to kill the weeds. In the first place, he continues, a sandy soil should be selected as it is usually free from obnoxious grasses, and it forms a desirable bed for the pineapple, owing to its great looseness and porosity. The superfluous leaves, ratoon, suckers, and slips should all be destroyed, unless the ratoon or the lowest sucker must be saved to take the place of the mother plant. Good cultivation will act as a remedy to the disease known as "tangle-root," which is characterised by the roots growing round and round the stem or tap root in search of food instead of reaching out into the ground. To facilitate hoeing and cleaning, an ample space between the plants should be allowed, for instance, about 80 centimeters between the plants in rows about 120 centimeters apart.

At the end of a period of about eight years, the writer goes on to say, the old plantation must be cleaned out and ploughed under with some manure or fertiliser to restore the elements which have been taken from the soil. As regards the fertiliser to be used, he suggests the following:—

A sufficient quantity of tobacco dust should be dropped into the heart of each plant; the tobacco serves as an insecticide as well as a fertiliser. The application per 1,000 plants following the harvest should consist of about 19 kilograms of dried blood, 14 kilograms of high-grade sulphate of potash, and 13.34 kilograms of acid phosphate; while the second application may be made of the following combination: 18.4 kilograms tankage, 22.08 kilograms of low-grade sulphate of potash, and 5.98 kilograms of basic slag.

Agricultural Education in Japan.

In an interesting article on Agriculture in Japan, in the *Detroit Free Press*, Mr. Frank G. Carpenter reviews the situation of agriculture in that country, and among other things refers to the steps which are being taken to educate the farmers there. "The farmers of Japan," he tells us, "are rapidly changing. There are public schools everywhere, and the boys and girls of the country communities attend them. Nearly every man can read and write, and most of the landholders know what is going on as to scientific cultivation. The Government is doing a great deal along the lines of agricultural education. It has big agricultural colleges at Tokyo and Sapporo; and there are thirty-six smaller colleges which are teaching theoretical and practical farming in the towns and prefectures. There are special colleges in Kyoto devoted to the art of silk culture, and instruction is also given in tea raising and in the other specialities of Japan.

"The Government has 310 travelling lecturers, who go from town to town and from district to district, preaching advanced agriculture to the farmers and instructing them as to insects, fertilisers and various crops. Some of these men are present at every agricultural show, and attend also to the experimental farming carried on at the public expense. Japan has now more than 200 experiment stations, and there are other experiment stations established by the farmers themselves. The first of these stations were organized by men from our Agricultural Department, and there have been many American professors in the colleges. Among the experiment stations is one for the study of the tea plant and of all modes of curing the leaves and preparing them for the market. There is also an imperial silk farm and an imperial cattle and horse-breeding establishments.

New Fruits.

We learn from the *Western Fruit Grower* that fruit-growers in the tropical portions of the United States are soon to be introduced to some new kinds of fruits which can be grown in their orchards. These are the Sapodilla, Ceriman and Sugar apple, which the Department of Agriculture has recently introduced into warmer portions of the United States. It has been reported that capitalists are planning to make some rather expensive plantings of these fruits in Southern Florida. These fruits are not altogether unknown in American markets as they have been shipped in very small quantities from the tropics. But up to the present time they have never been produced on American soil because of the impossibility of getting the plants. However the explorers sent out by the Department of Agriculture have supplied this country with the necessary stock, and the markets in a few years will be supplied with these delicate and delicious fruits grown at home.

Meteorological Returns.

Meteorological Observations taken at the Govt. Stations for the Month of February, 1910.

STATIONS	TEMPERATURE (Fahr. Deg.)				RAINFALL (In Inches)						
	Means for Month		Maximum for Month	Minimum for Month	Total for Month	No of Days	Heaviest rainfall in 1 day.		Total for Year from July 1 1909	Total for same period from July 1 1908	
	Maximum	Minimum					Fall	Day			
Observatory ..	81.8	68.3	87	61	2.93	14	.92	18th	19.42	28.50	
Stanger ..	84.3	66.1	96	63	3.30	11	1.48	1st	37.01	30.42	
Verulam ..	86.5	67.3	100	63	3.15	10	.98	17th	25.42	27.59	
Greytown ..	79.7	54.6	93	46	3.72	15	.95	8th	28.32	34.45	
Newcastle ..	87.2	54.5	95	45	4.21	13	.75	18th	25.86	—	
Lidgerton ..	88.7	51.1	94	41	5.65	16	1.11	5th	31.82	35.72	
Estcourt ..	79.1	58.6	89	52	3.53	11	1.76	1st	23.48	24.46	
Umbogintwini ..	83.2	67.9	91	67	2.97	15	.72	2nd	31.65	—	
Mid-Illovo ..	78.1	58.0	95	51	5.53	18	1.00	27th	32.95	32.46	
Imbizana ..	82.8	65.2	98	60	3.72	14	1.02	1st	27.68	31.81	
Port Shepstone ..	82.8	61.5	88	55	4.03	13	.75	18th	28.56	30.82	
Umzinto ..	90.4	58.8	101	55	3.50	9	.84	10th	31.01	33.42	
Richmond ..	78.3	58.9	93	52	7.87	17	2.08	12th	40.71	42.08	
Maritzburg ..	—	—	—	—	—	—	—	—	—	28.19	
Howick ..	79.0	57.9	89	54	4.02	14	.66	9th	26.14	31.49	
Ladysmith ..	84.9	60.6	97	57	7.15	14	1.96	22nd	23.10	—	
Dundee ..	85.1	60.2	93	53	5.06	9	1.00	9th	28.62	35.88	
Weenen Gaol ..	87.9	60.1	98	54	3.55	13	.85	23rd	21.92	27.36	
Krantzklouf ..	80.0	63.6	94	59	4.02	13	1.14	27th	34.85	31.61	
Camperdown ..	81.5	67.8	94	53	3.30	8	.50	11th	20.05	22.62	
New Hanover ..	86.9	68.9	99	52	4.02	14	1.72	8th	34.29	32.36	
Krantzkop ..	84.8	55.4	91	50	3.43	8	.69	8th	33.15	27.09	
Nqutu ..	80.4	62.2	84	50	1.31	9	.27	10th	—	32.63	
Utrecht ..	89.0	55.5	93	49	3.51	4	1.05	22nd	21.52	—	
'Ngomi Forest ..	74.9	56.2	85	49	12.88	21	2.93	10th	60.03	—	
Empangeni ..	86.2	65.5	97	60	5.89	11	2.35	10th	39.61	32.17	
Umbono ..	77.3	62.0	86	57	15.20	11	5.28	12th	45.15	37.45	
Mtunzini ..	85.3	56.1	92	52	8.32	7	3.00	1st	62.16	49.37	
Point ..	—	—	—	—	3.28	10	1.20	17th	31.87	32.37	
Nottingham Road ..	75.3	54.2	87	46	4.14	12	1.41	9th	23.42	—	
Charlestown ..	77.0	53.0	86	43	3.72	13	1.32	18th	24.71	40.04	
Bulwer ..	—	—	—	—	7.38	21	1.99	8th	38.77	45.80	
Ixopo ..	—	—	—	—	6.54	16	2.13	16th	26.47	27.55	
Dargle ..	—	—	—	—	10.77	18	2.67	9th	—	—	

Meteorological Observations taken at Private Stations for the Month of February, 1910.

STATIONS	TEMPERATURE (In Fahr. Degs.)		RAINFALL (In Inches)						
	Maximum for Month	Minimum for Month	Total for Month	No. of Days	Heaviest rainfall in 1 day		Total for Year from July 1, 1909	Total for same period from July 1, 1908	
					Fall	Day			
Hilton	88	51	5.54	20	1.18	8th	32.88	33.58	
P.M.B. Botanical Gardens	96	52	6.40	18	2.28	8th	27.30	29.06	
Ottawa	—	—	3.05	11	.85	18th	26.49	27.90	
Mount Edgecombe	—	—	3.42	13	1.02	27th	31.48	29.98	
Umzinto, Beneva	—	—	4.22	14	1.06	9th	27.67	31.32	
Reit Vlei	—	—	3.42	13	.84	5th	20.66	25.66	
Cedara—Hill Station	93	50	7.77	24	2.52	1st	—	24.12	
— Vlei Station	94	46	7.46	18	2.47	9th	—	24.97	
Winkel Spruit	90	57	3.38	15	1.40	1st	28.20	30.38	
Weenen	94	46	3.52	10	1.08	9th	20.80	—	
Giant's Castle	74.4	52.1	6.36	19	1.51	6th	34.11	39.43	
Umhlangeni	—	—	5.02	14	.9.	19th	—	33.03	

Coal and Labour Return.

Return of Coal Raised and Labour Employed at the Natal Collieries for the month of February, 1910:—

COLLIERY	Average Labour Employed					Output Tons Cwt.
	Productive Work			Un productive Work *	Total	
	Above Ground	Below Ground	Total			
Natal Navigation ..	410	756	1,166	23	1,189	26,598 10
Durban Navigation ..	303	896	1,199	—	1,199	23,415 —
Elandslaagte ..	289	886	975	25	1,000	19,380 —
St. George's ..	253	496	749	—	748	16,139 —
Dundee ..	262	485	747	—	747	13,729 2
South African ..	165	439	604	7	611	13,455 4
Glencoe (Natal) ..	180	466	636	92	728	12,365 18
Natal Cambrian ..	202	417	619	18	637	10,741 17
Hlobane ..	164	389	543	30	573	10,140 16
Talana ..	141	410	551	32	583	7,455 —
Hatting Spruit ..	84	186	270	23	293	7,088 17
Newcastle ..	76	334	410	11	421	6,787 2
Natal Steam Coal Co. ..	101	230	331	10	341	6,137 7
Ramsay ..	96	160	256	6	262	4,318 17
Burnside ..	52	153	205	208	413	3,766 18
Ballengeich ..	90	178	268	11	279	3,498 2
West Lennoxton ..	56	65	121	—	121	1,356 10
Dewar's Anthracite ..	7	7	14	—	14	85 —
Vryheid ..	3	5	8	—	8	25 —
†Vaalbank ..	—	8	8	8	16	15 10
Totals ..	2,924	6,755	9,679	504	10,183	186,508 18
Corresponding Month, '09	2,662	5,366	8,018	310	8,328	137,822 —

	Productive Work			Un-productive Work	Total, Jan., 1910	Total, Jan., 1909
	Above Ground	Below Ground	Total			
Europeans ..	218	196	414	79	493	399
Natives ..	1,119	4,509	5,628	312	5,940	4,600
Indians ..	1,887	2,050	3,637	113	3,750	3,329

* Cost charged to Capital Account.

† Includes December return.

Mines Department, Pietermaritzburg,
11th March, 1910.

CHAS. J. GRAY,
Commissioner of Mines.

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal Bunkered and Exported from the Port of Durban for the month of February, 1910:—

				Tons.	Cwt.
Bunker Coal ..	..	..	..	125,502	19
Coal Exported ..	..	..	..	21,974	4
Total ..	..	..	..	147,777	3

Customs House, Port Natal,
1st March, 1910.

GEO. MAYSTON,
Collector of Customs.

Return of Farms at Present under Licence for Lunglokness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Crow	Ladysmith	Scab	Natives	Roosboom
			Natives	Rooipoort
			H. Collins	K eintfontein
A. B. Kos	Portion of Estcourt	"	R. Mattison	Calcott
		"	W. Crouch	Oakh mpton
		"	H. Hatting	Driefontein
		"	R. J. Lund	Doveton
		"	J. L. van der Merwe	Winterton
		"	C. Hatting	Doornkop
		"	J. Ralfe	Frere
A. C. Williams	Utrecht	"	J. Davel	Nooynst oom
		"	F. Dekker	Uitzock
		"	G. J. Moll	Wildeboschspruit
		"	D. Pfaff	Groen Vlei
		"	P. Allen	Schurweklip
		"	G. H. Davel	K ipfontein
		"	J. D. Davel	Skuinshoek
		"	H. A. Davel	Klipfontein
		"	P. F. de Jager	Waterval
		"	W. Steenkamp	Hoekrantz
		"	A. T. Davel	Klipfont ein
L. Trenou	Alfred	Lungsickness	E. F. H. Garland.	Whitecliff
		scab	Natives	The Refuge
J. Ralfe	Lion's River	Lungsickness	Smith-Baththwaite	Locusts No. 2
E. Wingfield Stratford	Newcastle	Scab	L. Havemann	Los kop
L. G. Wingfield	Newcastle	Lungsickness	C. Kemp	Vengelogen
		scab	J. Gibbs	Highton
		"	P. de Wet	G berbranagh
G. Daniell	Vryheid	"	Natives	Prinz Hoek
		"	J. P. van Rooyen	Eenswonden
		"	Natives	Weltevreden
		"	D. de Bruyn	Scheeperslaagte
J. R. Cooper	Nkandhla & Ngutu	"	Natives	Vaalkop
		"	H. J. du Preez	Batshe
		"	J. G. du Preez	Good Hope
		"	J. G. du Preez	"
E. Varty	Western Umvoti	"	F. H. Nel	Lakochel e
		"	J. A. Graham	Vernmaak's Kraal
		"	Natives	Driefontein
R. Mayne	Eastern Umvoti	"	Natives	Waterfall
		"	C. J. H. Nel	Fau's Rest
		"	P. H. Ma e	Speculation
		"	J. L. van Rooye	Krantzkop
		"	Natives	Blads Vlei
		"	Van Rooven Bros.	Wonderfontein
E. W. Bowles	Ixopo	"	Natives	Batmand
A. H. Ball	Weenen	"	J. P. Lotter	B rg Vleit
		"	P. H. Van Roo en	buffels Hoek
		"	P. P. van Rooyen	Doornkloot
		"	Naude & Lotter	Scottshoek
		"	J. T. van Rooyen	Beide Vae
		"	P. M. Lotter	Waterfall
		"	P. H. van Rooyen	Buffels Hoek
		"	E. C. Robinson	Mona
A. J. Marshall	Dundee	"	Learns Bros.	Go an Brae and
		"	"	Navigation Collie y
J. F. van Rensburg	Ngotshe	"	M. J. Swart	Geluk
		"	Mrs. E. Wessels	Gauk
		"	J. C. J. Liversage	Tov rnaarsrust
		"	Mrs. S. Vernmaak	Frisgewacht
		"	C. J. Vernmaak	"
E. W. Larkun	msinga	"	A. Dowate	Gordon Memorial
K. Ripley	Emtonjaneni	"	Native	Crown Lands, Beyala.
		"	Natives	Morgenzen
		"	"	Crown Lds., Hed Hill.
		"	"	Protest
		"	Native	Elizabeth
		"	H. Saunders	Vlaakbult
		"	Natives	Rustverwacht
A. Hair	City and Umzeni	"	F. Knapp	Zwaartkop Valle
J. Radford (Acting)	Paulpietersburg	"	J. A. Craig	Frieschgewagd
C. E. Walker	Portion of Estcourt	"	Mrs. M. C. Marais	Malan Spruit
H. van Ro yen	Babanango	"	W. Pretorius, Jun.	Weivervent
		"	Natives	Babanango

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified:—

ON THE 6TH APRIL.

Ashley (Ixopo Division)—(1) Blue and white goat ewe, about one year old. (2) Light brown goat ram, about one year old. Probable value, 5s. Impounded on the 18th February, 1910, by Meungu, Lufafa.

Bulwer—Black yearling colt, flea bitten. Found straying on Mellor Bros. farm, Hilltop, and reported by Natal Police as being too wild to be driven to the Pound.

Donnybrook (Polcra Division)—Bay mare, age about five years, three white feet, front off knee white, white patch on stomach, and white blaze.

Hatting Spruit—Young foal, bay filly, about three months old, no brands. Reported by Mr. W. H. Robins, of Sweetwaters, as being too wild, or too stupid, to be driven to the Pound.

Jugogo—Dark bay gelding, aged, no brands, very small, saddle mark on off side, standing about 15". Impounded by Natal Police, Spitzkop, on February 4th 1910.

Mount Hope (Klip River Division)—Ewe lamb, merino, no marks, no brands value 5s.

Ngutu—Chestnut Gelding, aged, about 14", three white stockings, white face, piece out back off ear, long mane, switch tail, indistinct brands near hind quarter.

Thornville Junction—Black she goat, ear marked notches out of both ears.

Weenen—Bay mule mare, black points, branded 4235 near neck, 546, or it might be 546, over C near rump, heart (reversed) near thigh, and S ~ and circle with J in centre off rump, harness mark on neck, white mark off front fetlock.

ON THE 13TH APRIL.

Vergelegen (Vryheid Division)—Bay horse, pony stallion, no brand or ear marks slight white hind hoofs, scar on back, looks like saddle mark about six years old. Impounded by Mr. J. J. Birkenstock, Hlobane.

ON THE 20TH APRIL.

Ashley (Ixopo Division)—Brown pig, black spots, four white feet tail cut off, about three months old.

Greytown—Black wether goat, one year old, no brand, mark on front of both ears half moon. Running on the farm of Mr. J. T. Martens, Highbury, near Greytown.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, N. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Division of Agriculture & Forestry Notices

FEEES FOR AGRICULTURAL ANALYSIS.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experimental Farm, Cedara, in accordance with the following scale of fees, which is subject to revision :—

	Scale I.			Scale II.		
	£	s.	d.	£	s.	d.
FERTILISERS AND FEEDING STUFFS :						
Determination of 1 constituent	0	7	6	0	5	0
Determination of 2 or 3 constituents	0	15	0	0	10	0
Complete analysis	1	1	0	0	15	0
SOILS : Partial analysis of a soil in relation to its fertility						
Complete analysis of a soil	2	2	0	1	1	0
WATER : Irrigation and drainage						
VEGETABLE PRODUCE : Fodder, Ensilage, Grain, &c.	1	10	0	0	15	0
MILK, CREAM, BUTTER : Fat only						
.. .. : Complete	0	5	0	0	2	6
WATTLE BARK AND TEA : Tannin						
.. ..	0	5	0	0	2	6
CATTLE DIPS : Quantitative analysis of 1 to 3 principle constituents						
.. ..	0	10	0	0	5	0
INSECTICIDES :						
Qualitative analysis each constituent	0	5	0	0	2	6
Quantitative	0	10	3	0	5	0

Scale No. 1 is applicable to samples handed in by merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Director, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis performed by it; and, where such is deemed of sufficient public interest, it will remain at the discretion of the Director to remit any charges hereunder.

TREES FOR SALE.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casaurinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 6d. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders cannot be accepted for a smaller number than 100 trees.

PURCHASE OF TREE SEEDS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

POULTRY.

Orders will be received for eggs for sitting of the following breeds for immediate delivery :—Buff Orpingtons, White Leghorns, Silver Wyandottes and Plymouth Rocks.

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

WOOLLED SHEEP.

Offers are invited for young imported Rams being Rambouillet Merinos, Lincolns, Hampshires, Shropshires. Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible :—

Admittance of Students to the School of Agriculture.—House Master, Cedara.

Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.

Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.

Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.

Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.

Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.

Agricultural Seeds, etc., for Irrigation Farming.—Curator, Govt Station, Weenen.

Fruit.—Orchardist, Cedara.

Accounting Business.—Accounting Clerk, Cedara.

Woolled Sheep, Woolled Classings, &c.—Wool Expert, Cedara.

Apiculture—Aviary, Cedara.

E. R. SAWER,

Director, Division Agriculture and Forestry, Cedara.

His Excellency the Governor in Council has been pleased to appoint Messrs. A. Hylton Lee, W. E. Foster, and M. Liebenberg to act as assistant stock inspectors for the respective Divisions of Lion's River, Ixopo and Utrecht, with effect from the 19th January, 1st February, and 1st March respectively.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices, on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 124.—Practical man, age 35, unmarried, seeks position on any work. Can undertake or attend to any building work and erection of machinery, and has been accustomed to control of coloured labour. Could undertake management of small creamery. Not afraid of work. Has had considerable experience in Agriculture, and can produce highest references.

No. 125.—Single man, age 31 years. Was brought up on a farm in England. Is a tinsmith and plumber by trade, also has a good knowledge of carpentry. Speaks Dutch. Has been in South Africa for ten years.

No. 126.—Colonial, 35 years of age, desires to obtain a position as overseer or manager of an ostrich farm. Has been for some years with first-class farmers, and had charge of some of the best birds in the Cape Colony. Has a practical knowledge of incubating, rearing of chicks, dosing and general management.

No. 127.—An expert fruit packer of four years' experience in Spain and France, and twenty years Colonial experience, is open to accept an engagement after 25th April next. He is open to accept low wages, with board and lodging, and fare to and from the Cape where he is at present.

No. 128.—Wishes to secure employment on a farm. States that he has a general knowledge of engineering, and has been employed on a large and well-known farm in the Richmond Division.

No. 129.—Wishes to secure employment on a farm. Experience in gardening and agricultural work generally, but more especially the former.

No. 131.—Age 20. Was a student at College of Agriculture, Cape Colony, where he gained a diploma. Has also won prizes for butter making at the Rosebank and Port Elizabeth Shows. Has been in the services of the Orangia Creamery Co., Bethlehem, which he left on account of conditions of employment not being suitable to his requirements.

No. 132. Age 37. Has had nine years experience as Assistant and Manager on Tea Estate in Assam, and has a thorough practical knowledge of tea making in all its Departments. Would like to obtain an appointment in a Tea Garden in Natal. Has a knowledge of several Indian languages.

No. 133.—Desires appointment as Farm Manager. Has had a thorough knowledge of growing and packing fruit, also lucerne growing and hay making. Has also had experience in Ostrich and Stock farming.

No. 134. Age 37. Wishes to obtain experience on an Ostrich farm for a year. Would be willing to invest £700 at the end of the term of probation, and on the expiry of a year's partnership would be willing to increase that sum to £1 000.

No. 135.—Age 35. Has a knowledge of poultry and bee-keeping. Total abstainer. Non-smoker. Good references. Is anxious to get on to a farm.

No. 136.—Wishes to secure employment on an Ostrich farm. Very good references.

No. 137.—Understands carpentry and wagon making. Is anxious to secure a position on a farm.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

EMPLOYMENT FOR GIRLS.

The Minister of Agriculture has received a letter from the Chairman of the Transvaal Land Settlement Board, stating that he has been asked by several correspondents in England if there are any openings in South Africa, such as in creameries, for girls trained at Bromsgrove Colonial College and other such training centres in England. We should be glad to hear from any institutions or farmers in Natal who may be in a position to offer situations to girls who have been trained at such Colleges, when we shall be pleased to place them in communication with the Chairman of the Transvaal Land Settlement Board.

Agricultural and Other Shows, 1910.

DUNDEE (Dundee Agricultural Society).—Show, 23rd and 24th June. J. McKenzie, Box 105, Dundee, *Secretary*.

DURBAN (Durban and Coast Society of Agriculture and Industry).—Show, 6th, 7th and 8th July. J. Morley, 399, Smith Street, Durban, *Secretary*.

DURBAN (Durban County Farmers' Association).—Hold no Show, but an Exhibit will be arranged for at the Show held by the Durban and Coast Society of Agriculture and Industry. F. J. Volett, New Germany, *Secretary*.

DURBAN (Durban and Coast Poultry Club).—Show 6th, 7th and 8th July. H. M. Fletcher, 20, Castle Arcade, Durban, *Secretary*.

ESTCOURT (Weenen Agricultural Society).—Show, 21st and 22nd June. E. Catherley, Estcourt, *Secretary*.

GREYTOWN (Umvoti Agricultural Society).—Show, 8th June. W. H. Gibbs, Box 24, Greytown, *Secretary*.

GREYTOWN (Umvoti Farmers' Association).—Date not yet fixed. C. J. Nel, Greytown, *Secretary*.

LADYSMITH (Klip River Agricultural Society).—Show, 10th and 11th June. W. J. Teasdale, Ladysmith, *Secretary*.

MID-ILLOVO (Mid-Illovo Farmers' Club).—Show held under the Mid-Illovo Agricultural Society. J. W. V. Montgomery, Ismont, Mid-Illovo, *Secretary*.

PIETERMARITZBURG (Royal Agricultural Society).—Show, 16th, 17th and 18th June. Duff, Eadie & Co., Timber Street, Pietermaritzburg, *Secretaries*.

PIETERMARITZBURG (Natal Poultry Club).—Show, 16th, 17th and 18th June, in conjunction with the Royal Agricultural Society's Show. E. G. Blundell, Box 250, *Secretary*.

PINETOWN (Pinetown Horticultural Society).—Show held 15th January, 1910. T. H. Trotter, Riverside, Pinetown, *Secretary*.

STANGER (Victoria County Agricultural Society).—Show, 9th June. H. C. Smith, Stanger, *Secretary*.

UNDERBERG (Himeville Agricultural Society).—Show, 9th April. G. Palframan, Watermead, *Secretary*.

CAMPERDOWN (Camperdown Agricultural Society).—Show, 22nd July. Walker and Burchell, Camperdown, *Secretaries*.

SOCIETIES HOLDING NO SHOWS.

Bryne Farmers' Association; Boston Farmers' Association; Donnybrook Farmers Association; Dronk Vlei Farmers' Association; Garden Castle Farmers' Club; Greytown Horticultural Society; Ladysmith Farmers' Association; Malton Farmers' Association; Polela Agricultural Society; Seven Oaks Farmers' Association; Umsinga-Biggarsburg Farmers' Association; Utrecht Boeren Vereniging; Vryheid Agricultural Society.

Frere Dipping Association; Altred County Farmers' Association and Agricultural Society.

Farm Apprentices' Bureau.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

- | | | | | |
|-----|-----|---------|---|---|
| No. | 3. | Age 24. | Colonial born | Has a knowledge of bookkeeping. |
| „ | 13. | Age 20. | Is an orphan. | Is anxious to learn farming. |
| „ | 15. | Age 19. | Is desirous of learning farming. | |
| „ | 25. | Age 23. | Bricklayer by trade. | Is anxious to get on a farm. |
| „ | 27. | Age 19. | Has had one year's experience on a farm in the Cape Colony. | |
| „ | 30. | Age 15. | Transvaal born | Has had experience on a mixed farm. Speaks Dutch and Zulu. |
| „ | 34. | Age 18. | Has a slight knowledge of Zulu. | Understands carpentry. |
| „ | 35. | Age 21. | Has had five years' experience on farms. | Understands cattle and horses and Agriculture. Is anxious to get back on a farm. |
| „ | 40. | Age 24. | Has had a little experience of farm life. | Understands bee-keeping. Is anxious to get on a farm. |
| „ | 46. | Age 21. | Served a term of apprenticeship to a firm of agricultural implement makers. | Industrious and level-headed lad. Very good references. |
| „ | 47. | Age 21. | Is anxious to obtain a situation on a farm. | Has been in ironmongery trade for 2½ years. |
| „ | 48. | Age 18. | Has had 4½ years' experience in agricultural and stock farming in the Dundee and Ixopo Divisions. | Has had a good deal of experience with cattle, but not much with sheep. Has also had experience with poultry and a little with bees. Is a good Zulu linguist. |
| „ | 49. | Age 21. | Colonial born. | Has had three years' experience on farms, two years in the Mooi River Division and one year dairy farming in the Transvaal. Good references. Speaks Zulu. |
| „ | 50. | Age 15. | Has not had any experience on a farm, | but is anxious to learn farming. |
| „ | 51. | Age 21. | Is very desirous of getting on to a stock farm. | Is strong and healthy. Has had a fair training in bookkeeping. |
| „ | 52. | | Has had nearly 3 years' experience in farming; | two years on an ostrich farm, and one on a general stock farm. |
| „ | 53. | Age 17. | Has had 18 months' experience of farming in Zululand. | Speaks Zulu. Understands cattle and horses. |
| „ | 54. | Age 18. | Has had 18 months' experience of farming at Harrismith. | Speaks Zulu and Dutch. Understands cattle and horses. Is anxious to get back on a farm. |

Government Cold Stores and Abattoirs..

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

Charges in respect of Cattle and the Meat of Cattle.	Calves up to one year old.	Cattle over one year old.	
		Rate per single head.	After reaching 100 head in month.
<i>Abattoir.</i>	s. d.	s. d.	s. d.
1. Receiving, per head... ..	0 3	0 6	0 3
2. Killing and Dressing, per head	2 0	3 6	2 9
3. Disinfectants	0 1	0 1	0 1
4. Cleaning Tripes, each	0 6	0 6	0 6
5. „ Sets Feet, per set	0 6	0 6	0 6
6. „ Calves' Heads, each ..	0 9	—	—
<i>Bagging Charges.</i>			
1. Per Body of Beef	1 3	2 6	1 9
2. Bagging Labour, per body	0 3	0 6	0 3
Hessian, 3d. per yard.			
<i>Special Storage Rates for Chilling up to 72 hours.</i>			
1. Chilling Beef, per body	1 3	2 9	1 9
2. Chilling Offal, per set	0 6	1 0	0 6

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars apply to the Manager, Government Cold Stores.
Department of Agriculture, Maritzburg, 21st December, 1908.

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the Fund, Colonial Offices, Pietermaritzburg.

All Correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

Publications Issued by the Department of Agriculture.

THE following publications, issued by the Department of Agriculture, are still in print, and copies may be obtained free (except those with price attached) upon application to the office of the *Agricultural Journal*, Department of Agriculture, Pietermaritzburg. The figures in square brackets (e.g. [1904]) are the years in which the various publications were issued.

No.

BULLETINS.

- 2.—"Manures on the Natal Market, 1902," by Alex. Pardy, F.C.S., Analyst. [1902.]
- 4.—"Manures on the Natal Market, 1903," by Alex. Pardy, F.C.S., Analyst. [1903.]
- 6.—"Manures on the Natal Market, 1904," by Alex. Pardy, F.C.S., Analyst. [1904.]
- 7.—"Tree-planting in Natal," by T. R. Sim, F.L.S., Conservator of Forests. [1905.]
(Price 2s. 6d., post free.)
- 8.—"Agricultural Co-operation," by E. T. Mullens, Secretary, Minister of Agriculture. [1905.]
- 10.—"Manures on the Natal Market, 1905," by Alex. Pardy, F.C.S., Analyst. [1905.]
- 11.—"East Coast Fever," by S. B. Woollatt, Principal Veterinary Surgeon. [1906.]
- 12.—"Manures on the Natal Market, 1906," by Alex. Pardy, F.C.S., Analyst. [1906.]
- 13.—"Report on the Disease known as 'Bluetongue' in Sheep," by H. Watkins-Pitchford, F.R.C.V.S., F.R.S.E., Govt. Bacteriologist and Director, Govt. Laboratory. [1908]
- 14.—"Poultry-Keeping in a Simplified Edition for Farmers," by F.C. [1908.]
- 15.—"The Export of Citrus Fruit," by Claude Fuller. [1909.]
- 16.—"Some Common Bagworms and Basketworms," by Claude Fuller. [1909.]
- 17.—"Dipping and Tick-Destroying Bacteriologist and Director, Govt. F.R.C.V.S., F.R.S.E., Govt. Agents," by H. Watkins Pitchford, Laboratory. [1909.]

REPORTS.

- Annual Report of the Agricultural Department, 1902. (Includes Reports of the Director of Agriculture, Entomologist, Conservator of Forests, Dairy Expert, Editor *Agricultural Journal*, etc.) [1903.]
- Report of the Secretary, Minister of Agriculture: January 1, 1903, to June 30, 1904. [1905.]
- Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1905. [1905.]
- Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1906. [1906.]
- (For a continuation of the statistics given in these reports see reprint "Natal's Progress in 1906," noted below.)
- Fourth Report of the Government Entomologist: 1903-4. [1905.]
- Fifth Report of the Government Entomologist: 1904-5. [1906.]
- Sixth Report of the Government Entomologist: 1905-6. [1907.]

(The Third Report of the Entomologist is included in the "Report of the Agricultural Department, 1902," noted above.)

Report of the Conservator of Forests, 1902. [1903.]

Interim Report of the Conservator of Forests up to December 31, 1905.

Report of the Principal Veterinary Surgeon, for year ended 30th June, 1906. [1907.]

First Annual Report of the Land Board, 1905. [1906.]

Annual Report of the Land Board, 1906-7.

MISCELLANEOUS REPRINTS, ETC.

Black Spot ("Letter Book Pages": reprinted from *Journal*.)

Mealie Grubs (do do)

Mosquitoes (do do)

Woolly Aphis (do do)

Cotton. By A. N. Pearson, Director, A. E. & C. (Reprinted from *Journal*: 1904.)

Co-operation. By E. T. Mullens, Secretary, Minister of Agriculture. (Reprinted from *Journal*: 1907.)

Citrus Fruit Export. (Reprinted from *Journal*: 1907.)

Natal's Progress in 1906. (Reprinted from *Journal*: 1907.) The statistics contained in this paper are on the same lines as those in the Annual Reports for previous years of the Secretary, Minister of Agriculture.

Natal's Progress in 1907. By H. J. Choles, F.S.S. (Reprinted from *Journal*: 1908).

Fibre Cultivation. (Reprinted from *Journal*: 1907.) This paper is a summary of Bulletin No. 13 of the Department of the Interior, Bureau of Agriculture, Manila.

Sisal, Mauritius Hemp and other "Aloe" Fibres. By T. R. Sim, F.L.S., Conservator of Forests. (Reprinted from *Journal*: 1907.)

The Fibre Industry of Mauritius. By Leonard Acutt, J.P., Tongaat; Member of the Land Board, Natal. (Reprinted from *Journal*: 1907.)

South African Products Exhibition, 1907. Report of T. R. Sim on the Natal Exhibits. (Reprinted from *Journal*: 1907.)

Poplar Timber for the Local Manufacture of Matches. By E. R. Sawyer, Director, E.S. (Reprinted from *Journal*: 1908.)

Agricultural Industries and Land Settlement in Natal. [1907.]

Judging Fruit, Flowers, Plants and Vegetables at Shows. By T. R. Sim, F.L.S., Conservator of Forests. [1906.]

Agricultural Statistics, Natal, 1905-6. [1907.]

Model Rules for Agricultural Co-operative Societies. (*Price 1s., post free.*)

Too much fat in a pig will check the growth of bone and muscle.

Exercise will render the hens healthy and rid them of the superfluous fat. Then they will begin to think it is time to attend to business. Fat breeds laziness, and laziness is the handmaid of sterility.

Notice.

OWING to the increasing demands upon our space, we have arranged to publish *quarterly* instead of monthly as hitherto certain standing reference matter. This matter will consist of (1) Scale of Charges for Vaccines, etc., at the Government Laboratory; (2) List of East Coast Fever Advisory Committees; (3) List of Executives of Farmers' Associations; and (4) List of Publications issued by the Department of Agriculture. In future readers will find this matter in the January, April, July and October issues of the *Journal*.

NATAL GOVERNMENT RAILWAYS.

RATES FOR S.A. MAIZE, KAFIR CORN, OATS, RYE AND WHEAT, FROM C.S.A.R. STATIONS FOR EXPORT OVERSEA BEYOND SOUTH AFRICA.

WITH effect from February 1st, 1910, the 506 miles limit now applicable to the export maize rate will be withdrawn, and the maximum rate of 10s. per 2,000 lbs. will apply to maize, kafir corn, oats, rye and wheat consigned from any C.S.A.R. Station to Point for export oversea beyond South Africa, subject to the conditions set forth in Clause 73, page 92, of Goods Tariff Book No. 23.

General Manager's Office,
Maritzburg, 24th January, 1910.

HEDLEY SALMON,
Acting General Manager.

SOUTH AFRICAN STUD BOOK.

A record of all classes of Stock; the object being to encourage the breeding of thoroughbred stock and to maintain the purity of breeds, thus enhancing their value to the individual owner, and to the country generally.

Application for Membership and Entries of Stock should be addressed:—

For CAPE COLONY	A. A. PERSSE, P.O. Box 703, Cape Town.
„ TRANSVAAL	F. T. NICHOLSON, P.O. Box 134, Pretoria.
„ ORANGE RIVER COLONY ..	E. J. MACMILLAN, Government Buildings, Bloemfontein.

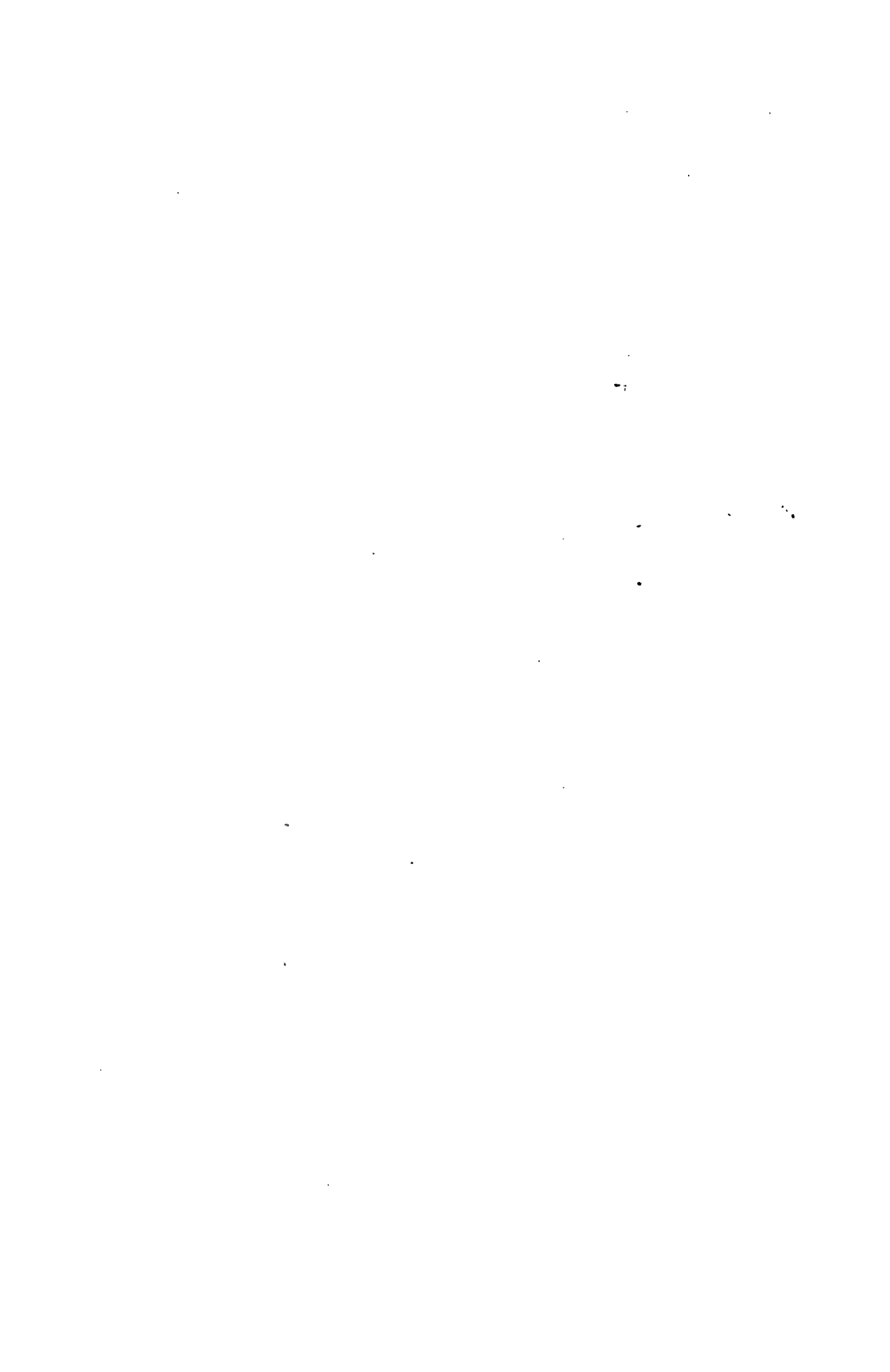
THE SOUTH AFRICAN STUD BOOK

IS OBTAINABLE OF:—

T. MASKEW MILLER,
ADDERLEY STREET, CAPETOWN.

PRICE 10s. 6d.

A. A. PERSSE,
SECRETARY, SOUTH AFRICAN STUD BOOK ASSOCIATION.





THE LARGER WATTLE CHAFER.
(*Hippopholis sommeri*, Burn). Natural size.

(See Article on "Some Wattle Insects," by Mr. Claude Fuller.)

*The Natal Agricultural Journal.****Intensive Methods in Farming.***

THE tendency in modern agriculture is towards intensiveness in the settlement of the land and intensiveness in cultivation. As time goes on the necessity for more intensive methods—which means nothing more or less than the increasing of the interest on the capital that is held in the form of land—comes more and more to be realised. Two factors in particular work in this direction: one is the economic pressure which is brought to bear on the holders of land to sub-divide their holdings—which sub-division may take the form of making provision for the support of a growing family;—the other is that natural tendency which exists in man to secure the biggest possible return on his capital; as time goes on science is able to show farmers how to increase the output of their land (whether that output takes the form of crops or stock), and the more progressive farmers are not slow to avail themselves of the teachings of science whilst the less progressive gradually come to follow the example of the others.

In connection with the former of the two factors mentioned above, it is to be observed that as the settlement of a new country progresses, as the demand for land grows with the increasing population, as the commerce and industries of the country grow and flourish, the price of land is automatically forced up. It then remains for the holder of a considerable tract of land either to realise a portion of his increased wealth by selling a part of his land, or to adopt such improved methods of farming as to enable him to obtain a just interest on the capital value of his land. He may, for instance, have gradually worn out his land by growing one particular crop much more than others on account of his having a regular market for that crop, and gradually the return per acre yielded by that land has naturally diminished. He must now adopt better methods of cultivation and begin manuring his land on the most approved lines, in order not merely to secure once more the yield which the land originally furnished, but also to increase that yield until it has reached such a point as to constitute an equitable return on the in-

creased value of the land. In either case intensiveness in cultivation is arrived at sooner or later. If the land is sub-divided and sold, the future holders of the land will have smaller farms to work with, and they will have, as a consequence, to expend a larger amount of effort in order to produce sufficient to give them a reasonable return; and on the other hand, as we have seen, if the original holder of the land does not eventually sell, he must, in order to make his holding a business proposition, adopt scientific methods of farming to increase the monetary return yielded by each acre of land.

It is thus apparent that the adoption of more intensive methods of farming must come as a natural consequence of the increasing settlement of the land. When the farmer is, by economic pressure, forced either to relinquish his old methods of farming or else be left out of the running altogether, Science comes to his aid, throwing a light upon nature and nature's requirements, and thus enables him to increase the yield of his land.

This then is the lesson which the agricultural history of every country teaches us. The old rule-of-thumb methods must be relinquished where they are not in accordance with the established teachings of science, and all that science has to offer which is likely to be of benefit to the practical farmer must be taken advantage of and as far as possible acted upon. We must learn which are the best grasses that we can put in as pasture for our stock, in substitution for the comparatively innutritious nature of veld grasses and so increase the stock-carrying capacity of our farms; we must learn what crops are suited to the climatic conditions of the district in which we live, for the purpose of serving as winter feed for our stock—if possible in the green state, otherwise in the form of hay or ensilage; we must study the constituents of stock feeds and the requirements of the nutritive processes from the points of view of fat, lean meat, blood, muscles, tendons, etc., and balance accordingly the rations we prepare for our stock; we must ascertain the food requirements of the different crops we grow and study the respective values of different manures furnishing the same element of plant food; we must enquire into different methods of cultivation and learn the value of deep and frequent tillage; we must be acquainted with the best methods of ploughing in order that every chance may be given to future crops to make the best use of the stores of food in the soil; we must realise the importance of drainage and know as far as possible the moisture requirements of the crops we grow; we must study the value of irrigation; we must know which crops and types of crop are the most economical to grow and which are best suited to the climatic requirements of our district; we must make some study of the principles of fruit culture in order that we may increase the output of our orchards. These are some

of the matters which it becomes more and more necessary for the modern farmer to study. In some of these directions the more progressive of our farmers are reasonably up-to-date, but Science is always finding fresh matter for the farmer, no matter how up-to-date he may be, to reflect upon. Then we have the commercial aspect of farming. It is not a very pleasant thing to have to say, but the fact remains that many of our farmers (and South African farmers are not unique in this respect) are sadly deficient in their knowledge of business principles. We should not like to say how many farmers keep books sufficiently elaborate to enable them to see how their farm stands as a commercial proposition, but we fear that the number of those who do take this trouble is very small. This is a matter which farmers ought seriously to consider. No man in ordinary business in the towns would dream of working without such a set of books as would enable him to ascertain at any time just how his business stood, and if men in ordinary business in the towns find that a detailed record of their operations is necessary, the farmer—who is, of course, to be considered also as a man with a business of his own—must surely find it of advantage also to keep some systematic record of his operations.

All this, however, is apart from our main theme. What we wished to draw attention to in this article is the natural tendency which is observable in modern times towards intensiveness in the settlement of the land and intensiveness in methods of farming. This tendency cannot be perverted; it is a natural outcome of certain factors which we alluded to towards the beginning of this article; and consequently the lesson for the farmer who observes these things is that, in order to keep abreast of the times and make the most of his resources, he must "take the bull by the horns" and be ready always to take advantage of and act upon the established teachings of science. We have used the term "*established teachings*," since we do not wish it to be understood that the result of every single experiment which is undertaken by a scientific institution can necessarily be accepted as final. Every scientist recognises that any conclusion which is arrived at and which is offered as a *final* conclusion must be established by the support of a number of experiments and investigations in the subject to which it refers. When, therefore, the results of a single experiment are published the farmer should endeavour to act upon the suggestion which appears to be offered by the experiment, but at the same time he should be careful not to accept the result of that single experiment as final until it is confirmed by further investigations.

A soft cloth is better to rub the dirt from a horse's legs than a curry comb.

The Maize Crop in March.

IN March the maize crop failed to make any progress as regards general improvement in its condition; in fact, the condition of the crop at the end of the month was a little lower than at the end of the previous month. At the end of February the average condition of the crop was 2.52, or about mid-way between "fair" and "average," and this was representative of a probable average yield of 4.4 muids to the acre. At the end of March the condition of the crop receded to 2.38, which corresponds to a yield of just over four muids to the acre—4.1, to be exact. The condition of the crop is nevertheless better than it was at the end of January, when there was promise of a yield of $3\frac{1}{2}$ muids to the acre only.

The condition of the crop this season is behind that of last season, as the following figures show. In this statement we give the average condition and the corresponding yield per acre in muids at the end of each month up to date, for this season and for last year; and we also continue last year's figures up to the end of the season, in order that readers may see what condition our crop has to arrive at before the possibility of last year's yield is reached:—

At End of—			Condition	Yield	Condition	Yield
January	...	...	2.0	3.44	3.1	5.34
February	...	...	2.52	4.34	3.0	5.16
March	...	...	2.38	4.1	2.69	4.63
April	...	...	...	...	2.7	4.65
May	...	...	...	...	2.64	4.54
June	...	...	...	...	2.82	4.86

As yet we are unable to state what the acreage planted this season is, as a sufficient number of schedules have not yet been received from farmers. We should take the opportunity here of urging all who have not yet sent in their forms to do so immediately, in order that we may be able to arrive at an estimate for publication in our next issue.

Readers will doubtless be interested to hear that the actual figures for last year's crop (1908-9) have just been compiled by the Statistical Officer of the Colonial Secretary's Office, and that the total crop he has arrived at, from the returns sent in by individual farmers, is only 2,100 muids less than the forecast we made last May—800,000 muids. This proves that we are working on the right lines, and we hope it will be an incentive to our correspondents to continue in their efforts to make their reports reliable.

We give below a table showing the progress or otherwise that the mealie crop is making in the various Magisterial Divisions of the Colony. In studying these figures it should be remembered that the four "conditions," "poor," "fair," "average," and "above the average," are represented by the figures 1, 2, 3 and 4, respectively, and that intermediate figures represent intermediate:—

CONDITION OF CROP.

(Note.—A condition "above the average" is represented by the figure 4; "average" by the figure 3; "fair" by the figure 2; and "poor" by the figure 1; intermediate figures represent corresponding conditions.)

Division	Condition of Crop at end of			
	January	February	March	
			This Year	Last Year
Lower Umzimkulu	3.2	3.0	3.0	2.5
Alexandra	2.5	2.7	2.4	3.0
Umlazi	3.0	2.0	2.0	2.5
Inanda and Indwedwe	3.2	3.0	3.4	2.0
Lower Tugela and Mapumulo	2.4	2.5	2.5	2.0
Impendhle	1.0	1.2	2.0	3.0
Alfred	2.5	3.0	2.5	4.0
Ixopo	2.7	2.7	2.8	3.0
Richmond	2.2	2.4	2.4	2.5
Umgeni	2.4	2.4	2.1	3.2
New Hunover	2.4	2.4	2.4	3.0
Lion's River	1.8	1.8	2.3	3.0
Umvoti	2.2	2.5	2.5	3.5
Krantzkop	2.8	2.8	3.0	3.0
Underberg	1.0	1.0	3.0	2.5
Pofela	1.0	2.0	1.5	4.0
Bergville	1.8	2.6	2.8	2.4
Estcourt	1.9	2.3	2.2	2.0
Weenen	1.6	2.0	1.7	2.0
Klip River	2.0	2.2	2.1	2.4
Umsinga	2.6	2.0	2.3	2.5
Dundee	2.2	2.5	2.8	2.0
Newcastle	2.2	2.4	2.4	2.3
Vryheid and Ngotshe	2.6	3.2	2.3	1.0
Utrecht	2.5	2.3	2.0	2.0
Paulpietersburg	4.0	3.4	2.5	...
Babanango	3.0	3.0	2.0	2.0
Eshowe	2.5	3.0	2.0	4.0
Mount Emtonjaneni	3.0	2.8	2.6	3.0

Successful water boring has been carried out by Messrs. Davidson and Thompson, contractors, Richmond, on the farms owned by Messrs. Adamstein Bros. at Deelfontein. In all four 8-inch holes were drilled, three of which yield from 100,000 to 150,000 gallons per diem, and the fourth and most successful has been struck in a lime formation at 24 feet, and has risen 15 inches above the level. This supply is calculated to irrigate 60 to 70 morgen under lucerne. Mr. J. McMillan, the boring engineer, states that this has been the most successful boring he has done in the Colony.—S.A. Commerce.



Queensland Sugar and White Labour.

THE progress of the sugar industry in Queensland has a peculiar interest for the Natal sugar grower in view of the general feeling here in favour of the abolition of indentured Indian labour for the estates and the experiment which the Queenslanders are making in the employment of white labour. The London correspondent of the North Queensland *Herald* has furnished the *American Sugar Industry* with some interesting particulars regarding the progress which his countrymen are making in this direction. So far as we can gather (for two statements he makes, on the vital question of the independence or otherwise of the industry of the bonus system which has been used to bolster up the industry in order to make the attempt to utilise white labour only possible at its inception, appear to be opposed to each other) the industry appears to be making progress. We quote, however, *in extenso*, what he says:—"During the discussion of the Estimates in the Queensland Parliament—on the vote for a bureau of central sugar mills—several members urged the desirability of establishing additional central mills. Mr. Philip (ex-Premier) said that, while three years ago Australia was supplying her own sugar market, she imported 5,000 tons last year, and 70,000 tons would have to be imported this year. If the Government started now to erect mills it would be some years before they could overtake consumption. *Cane could be grown by white labour so long as a good bonus was paid.* He urged the erection of three new mills at Ayr, Johnston River and Russell River.

"In this connection it is interesting to note," the writer proceeds, "that when sugar was first introduced commercially into Queensland in the early sixties, every planter erected his own mill. These were wretched affairs, viewed in the light of the present day. Some had horses for the motive power. The boilers were vertical, and each cane was passed through them by hand. The maximum output of juice per day amounted to about 1,500 gallons, producing little over half a ton of sugar. Half the juice was not extracted. A few of the better class mills were driven

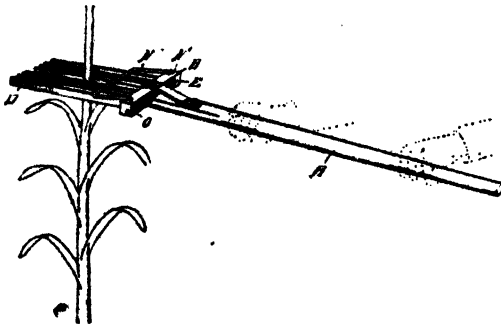
by steam, but all were of small power. The boiling was carried on in open pans, and vacuum pans were unknown. Fortunately for the growers, sugar in those days sold at from £30 to £40 per ton; so for a time the industry flourished. Then came the era of powerful mills, vacuum pans, chemical control of mills, triple-effects, cane-carriers, improved classification, improved centrifugals, and a host of minor improvements, with the result that, whereas in former days £2,000 was considered a high price for a steam mill, the cost rose to from £20,000 to £40,000. The price of sugar fell to from £10 to £12 per ton for raw sugar, yet, owing to the more scientific working, the profits made by the mill owners were infinitely greater. Then came the important innovation of the establishment of central mills by the Government, of which there are 13. These mills were erected in districts where considerable areas of cane in the aggregate were grown by farmers, and the repayment of the cost was secured by mortgage of the deeds of the cane supplies to the Government. Owing to the various adverse circumstances some of these mills failed to meet interest and redemption, and these reverted to the State for a time; but now the annual engagements of all have been met, one having paid off its indebtedness, and they are again in the hands of the farmers. There are 50 mills making sugar, two juice mills, and two refineries in operation in the State. Thirteen of the sugar mills (central mills) have received advances under the Sugar Works Guarantee Act. These advances in 1907 totalled £498,000, and on December 31st, 1908, the indebtedness to the State stood at £39,589. The figures for 1908-9 are not yet available.

“At present the principal industry in Northern Queensland is sugar growing. Since the deportation of the Kanakas large plantations have almost ceased to be. These, with few exceptions, have been cut up into farms varying from 50 to 300 acres in extent, which are cultivated by white labour, and, notwithstanding the high wages paid to the white labourers, *the crop is a highly remunerative one to the farmers*, agricultural machinery having taken the place of the hand labourer in preparing the land, irritating and clearing the crops.” The italics, both in the present paragraph and in the first one, above, are our own. We emphasise these two clauses in order to direct attention to their apparently contradictory nature. That the sugar cane crop “is a highly remunerative one to the farmers” we do not doubt, but we wish it had been made clear as to whether its remunerativeness is due to the bounty system under which the industry is being run or whether the industry is remunerative quite apart from the bounties which are paid on sugar produced by white labour. Any industry can be made “remunerative” under the bounty system. Whether it is due to the bounties or not, the

sugar industry of Queensland would, on the face of things, appear to be prospering; but the prosperity enjoyed by an industry which is built on bounties is, it must be admitted, rather an artificial one. We shall continue to look out for more information on the subject, and will endeavour to keep our readers fully informed.

A New Cane-Stripper.

A patent has been taken out in the United States by Mr. Eber A. Jones, of Stillwater, Oklahoma, for a cane-stripping device, an illustration of which we give below. The following is the description of the invention given by the *American Sugar Industry*:—"A cane-stripper comprising a handle, a cross-piece fastened thereto and provided with a series of apertures, stripped blades having butt ends extending through



said apertures and threaded, nuts fitted to the projecting threaded butt ends of the blades, a bail-shaped member having angled ends passing through apertures in said cross-piece and threaded, nuts mounted upon said angled threaded ends, said bail-shaped member being resilient and positioned crosswise of and adjacent to said blades." The patent was filed on the 26th November, 1909 (No. 946,604—Serial No. 530,052).

A New Fodder Plant.

Senator the Hon. J. H. McColl has drawn the attention of the New South Wales Department of Agriculture to *Scaevola collaris*, F. v. M. (Natural Order, *Goodeniaceae*), a comparatively rare plant, only found in South Australia, on sand ridges near the coast and in the interior. Senator McColl states that it has afforded fodder for sheep for some months, and that they did well on it. The N.S. Wales Department of Agriculture is endeavouring to obtain some seed for trial. Readers may be interested to know that there is a species of *Scaevola* (*S. lobelia*, Linn.) found in Natal (the only one of the two hundred which go to make up the Order), but whether it has any value as a forage plant we are unable to say.

Caravonica Cotton.

In our November, 1909, issue we referred to a communication which had been received by the Department of Agriculture from Messrs. S. A. Nathanson Commandite, P.O. Box 261, Durban, regarding the cultivation of Caravonica cotton, in which they set forth the terms upon which they were prepared to distribute seed free to any farmers who might wish to make a trial of the crop. The Department has now received a further communication from the same company, in which Messrs. Nathanson Commandite state that they are prepared to buy any quantity of unginned Caravonica cotton at highest market prices. We would draw our readers' attention particularly to the advantages which Messrs. Nathanson Commandite's arrangements offers. As we remarked in our November number, Messrs. Nathanson Commandite supply seed free of charge f.o.r. Durban on the following conditions:—(a) Intending growers must, in making application for seed, state situation and size of the farm and the proprietor's name; (b) growers must follow the instructions furnished with the seed *re* cultivation, and must allow Messrs. Nathanson Commandite to inspect the cultivated area at any time; (c) Messrs. Nathanson Commandite are to receive five per cent. of outturned crop, either in cotton or cash at option of growers. As a return for compliance with these conditions, Messrs. Nathanson Commandite are prepared to buy any quantity of unginned cotton (of the Caravonica type), which means that no machinery need be purchased by the intending grower.

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This is an opportunity of trying this new type of cotton which we think farmers would be well advised to take advantage of. We believe Caravonica cotton will flourish up-country, and we know for a fact that it is growing on several farms in the Vryheid district. As we have said, the seed is supplied free on rail at Durban, with full instructions for cultivation, etc., and there is a ready market in Durban for the unginned cotton. There is no reason why Caravonica cotton should not be taken up by farmers, at any rate as a side-industry; and those interested should write to Messrs. Nathanson Commandite. Early application should be made for seed. The best sowing period is between the end of October and the middle of November, but Messrs. Nathanson Commandite naturally require to have applications for seed well in advance.

The Lincolnshire Beet Sugar Scheme.

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Readers interested in the Lincolnshire beet sugar scheme will regret to hear of the failure of the attempt which has recently been made to start a beet sugar industry in the Old Country. Commenting upon the matter the *International Sugar Journal* says that all hopes for a successful issue seemed assured, but unfortunately the public failed to subscribe

the necessary capital; and for the present at any rate the project has had to be shelved. Possibly next autumn, the *Journal* adds, a further attempt may be made with better success. It is interesting to note by the way that a prominent firm of sugar importers undertook to furnish £10,000 of the capital, and the same sum was to have been accepted in shares by the German contractors in lieu of payment for part of the contract. But it was found impossible to obtain from the ordinary investor the balance needed, so all deposits received have been returned and all contracts cancelled. Lord Denbigh, in a letter to *The Times* of the 7th January, points out that while plenty of British capital is ready for investment in foreign rubber companies, people will not risk their money in British home enterprises, however beneficial they might be to the country and to the shareholders; also how persistently the free importers refuse to give any preference to Home enterprise.

Wine-Making for the Home.

In response to an inquiry from a correspondent we publish the following notes on wine-making for the home, for which we are indebted to the *Queensland Agricultural Journal*:—Twenty-four hours before the vintage, choose a quantity of the soundest and ripest grapes, sufficient to make 30 gallons of juice. Crush them in a clean hogshead with the head out, and cover with a clean linen cloth. Fermentation will have started before you begin your vintage. Then, as you crush your main crop, sprinkle this juice (or yeast, as it is called) over the fresh grapes. This will start a healthy fermentation. Before crushing the main crop, pick off all unsound and unripe grapes, and wash the bunches to remove bacteria. Run the juice from the crushing mill into a vat below it. A vat should not be larger than one with a capacity of 500 gallons. If fermenting is done on the skins, the vat must not be filled more than about 8 in. from the top. When all colour has been extracted from the skins, the juice should be racked off to finish its fermentation in the cask. White wine is made without fermenting on the husks.

When the fermentation is complete, rack the juice off into clean casks. Do this as soon as the wine has cleared. The casks should be well sulphured just before racking off. The sulphuring is best done by putting sulphur into a shallow iron cup and lighting the sulphur before lowering into the cask. The next thing is to keep the casks well filled up with sound wine of the same quality. In the spring a second racking should be given. For the production of claret, the stalks must be removed before crushing. The temperature during fermenting is from 80 to 90 degrees. When all fermentation has ceased and the wine is perfectly clear it may be racked off and bottled, or else racked off into a clean cask. Our own

experience of making wine may be here given, especially as the wine we made took first prize at one of the Brisbane shows many years ago. The grapes were removed from the stalks. All damaged and unripe ones were rejected. They were crushed by hand into a wooden tub, and juice and husks were placed in a cask with the head off to ferment. In a few days the clear juice was racked off into a clean cask to undergo a second fermentation. When this ceased, and the wine was perfectly clear, it was bottled, and proved to be a first-class white wine. Be careful never to ferment in a zinc tub. We once did this, with disastrous results.

A Watering Device for Poultry.

An ingenious form of self-filling water trough for poultry which has lately been invented and is being put on the market by Spratt's Patent, Ltd., is described and illustrated in a recent issue of *Monthly Hints on Poultry*. The troughs are designed to meet the demand for a really hygienic water vessel for game and poultry. By means of an ordinary sheet of galvanised corrugated iron, which will catch rain and dew, a constant supply of the best water is obtained. It is then stored in an air-tight, self-filling tank which keeps it pure for any length of time. By this means loss by evaporation is reduced to a minimum, and the bulk of the water is not exposed to the rays of the sun, which is a frequent source of disease. They save an immense amount of labour, as they entirely obviate the daily filling and cleaning required by the open vessel, and are unquestionably the best thing of the kind to be obtained. The $\frac{1}{2}$ -gallon and 1-gallon size are intended for use in laying pens, rearing fields, and aviaries; these are used without collecting sheets, and, filled in the ordinary way, will last a week or fortnight. The 2-gallon and 4-gallon size are designed for use in pheasantries, coverts, and isolated positions. As only a narrow water surface is exposed all round, it is impossible for young chicks to get drowned in them.

A New Banana Fibre Machine.

Up till a short time ago, only one machine, a hand one known as the "Duchemin" (a description of which appeared in the March, 1908, issue of the *Journal*—page 312) had been invented for extracting the fibre of *Musa textilis* from which the well-known Manila hemp is made. Now, however, a new machine has made its appearance—the "Clarke Hemp Machine"—and a preliminary account of it is given in the *Philippine Agricultural Review* of November, 1909. This machine, which is built in Hong Kong by the Philippine Hemp Machine Co., Ltd., has lately reached Manila, and has been subjected to most satisfactory tests at Palomar Park. It strips a full width of hemp leaf without splitting or "luxying," which is required by some machines. It will strip hemp up

to 11 ft., and after stripping the fibre, twists it into loose rope which makes it convenient for handling. Judging from the trials which were witnessed by officials of the Agricultural Bureau at Manila, it does excellent work. The introduction of such machines, says the *Review*, will work a great change in the hemp industry, not only in labour saving, and in reducing the loss of fibre to a minimum, but it will also produce a better grade of fibre, and make the grading of Philippine hemp (Manila fibre) an easy matter, which will have much to do with improving the standard and increasing the demand for Manila hemp in American and European markets. We shall look out for further particulars of this machine, for the benefit of our readers.

The Rubber Market in 1909.

We have received, through the Acting Agent-General, a copy of Messrs. S. Figgis & Co.'s annual review of the india-rubber market for 1909, which contains several points of interest to Natalians who may be thinking of going in for rubber cultivation or who may have already made a start in this direction. Commenting upon the improvement in the quality of rubber which has been evident during 1909, the report remarks that "this shows how profitable it has been for planters to wash and clean the rubber thoroughly, and to prepare as large a proportion as possible of good colour—also not to send many qualities or very small lots." Block, we notice, has not been in favour: unless clean resilient hard quality can be sent, "it may be better to ship as crepe or sheet." The advice which Messrs. Figgis & Co. give as regards packing may be usefully quoted: "Pack it in good, dry condition (excess of resin much objected to) into strong cases of 2 cwt. to 3 cwt. each. No paper, Fuller's earth, etc., to be used. The cases should be planed smooth inside to avoid small pieces of wood adhering to the rubber. Keeping different qualities and colours separate; where practicable keep immature separate; to send separately dirty, barky pieces, and to wash out all the bark in crepe, block, and sheet. All fine qualities should be loose crepe, sheet or biscuit—not run to a mass." Further, Messrs. Figgis & Co. advise: "Now that the quantities are increasing so rapidly, it is most desirable, for the future ready sale of plantation rubbers, for estates to 'standardise' the qualities they produce, and where practicable to ship, say, three qualities from an estate: No. 1 pale, No. 2 light brown and grey, No. 3 dark and brown. Pickings and very common and scrap to be sent in one bulk for sale on arrival; 'standardised' qualities can be sold, for forward deliveries, the same as Para has been sold for many years. Plantation must be largely sold 'forward' in future years." Smoked rubber, we learn also, appears to have greater resiliency and to be more suitable for many purposes than unsmoked. "Smoking" prevents the proteins in rubber from decompos-

ing, and tends to eliminate "tackiness." All fine rubber from Para is smoked.

Messrs. Figgis & Co. estimate that there are about 600,000 acres now under rubber cultivation in the East (partly mixed with other products), and 120,000 acres in Mexico, West Indies and Nicaragua, etc. The course of prices during 1909 was as follows:—In January good sheet realised 5s. 1½d. to 5s. 3d., pale crepe 5s. 4½d.; by May, 5s. 9d. to 5s. 10d., June 6s. 7d., July 8s. 2d. to 8s. 3½d., August (irregular) 7s. 10d. to 7s. 3d., and up in September-October to 9s. 1½d., and smoked 9s. 8½d. early November—the highest of the year. With large supplies of Para in December prices declined 2s., to 6s. 11½d., to 7s. 1½d. sheet and crepe, but since recovered: sheet to 7s. 3d. to 7s. 5d., fine crepe 7s. 6½d., smoked sheet 8s. 0½d. to 8s. 0¾d.: these were the closing prices of the year.

Alterations in Railway Rates.

The General Manager of Railways has notified that, with effect from the 24th April, 1910, the following reductions will be made in railway fares and rates:—(a) The 1st and 2nd class passenger fares appearing in pages 27 to 32 of Passenger Tariff Book No. 3 will apply in both local and through traffic over the N.G.R. This scale is lower than the scale at present in force. (b) The charges for books of mileage coupons will be reduced. (c) The No. 11 (fertilisers and minerals) tariff will be reduced for distances over 71 miles. (d) S.A. grain, forage and potatoes will be transferred to the revised No. 11 Tariff. (e) The rates on S.A. wattle bark, fruit, and low grade ores will be reduced. (f) The additional 25 per cent. now levied on certain articles classified at the normal rate, plus 25 per cent., will be abolished. (g) The live stock rates now operating in through traffic will be extended to local traffic. (h) The rates for vehicles (unpacked) now in force to the Transvaal will also operate in local traffic. (i) The rates for the conveyance of small parcels not exceeding 10 lbs. weight will be reduced, and certain articles will be reduced to the half parcels scale.—Particulars of the new rates to any specific station can be ascertained on application to the Assistant General Manager, Durban

Cape and East Coast Fever.

A Proclamation has been issued by the Cape authorities (No. 86, 1910), withdrawing Proclamation No. 572 of 1908 (which prohibited the introduction into Cape Colony from Natal of grass, hay, reeds, rushes, herbs, plants or other vegetable matter) and making other provisions in lieu thereof. The new Proclamation enacts as follows:—"It shall not be lawful to introduce from the Colony of Natal into this Colony, any

grass, hay, reeds, rushes, herbs, plants or other vegetable matter, and any fruit, vegetables, cereals, or other produce from Natal, including any receptacles containing the same, which may be packed in or found to have grass, hay or other prohibited articles as aforesaid mixed therewith may be confiscated and destroyed or otherwise disposed of at the discretion of the Minister, or any officer duly authorised thereto by him. . . . The provisions of this Proclamation shall have force and effect in the Territories of the Transkei, Tembuland, East Griqualand, Port St. John's and Pondoland, and it shall not be lawful to remove from the strips of land lying between the Ingwangwane, Indowana, Umzimkulu and Umtamvuna Rivers, and the fences which are being maintained by Government along the Natal-East Griqualand and East Pondoland Borders for the purpose of preventing the spread of East African Coast Fever, any grass, hay, reeds, rushes, herbs, plants or other vegetable matter.

"Any person contravening the provisions of this Proclamation shall be liable, upon conviction, to a penalty not exceeding twenty pounds sterling (£20), or, in default of payment, to imprisonment, with or without hard labour, for any period not exceeding three months for each such offence. Proclamation No. 572 of 1908 is hereby cancelled and repealed."

A Hemp-Stripping Machine.

Another fibre machine which is just being put on the market is a new hemp-stripping machine, patents in protection of which are being taken out by Messrs. Burn & Co., Ltd., of Calcutta, India. The capacity of the machine, according to the *Philippine Agricultural Review*, is claimed to be 1,000 lbs. of hemp per day. The hemp is fed at the top of the machine, through three corrugated rollers which are placed in the shape of a V. At the end of these rollers it is clamped and run through a single set of strippers revolving on a wheel that makes 1,000 revolutions per minute. At the point of contact with the strippers a powerful stream of water plays on the hemp just as it reaches the strippers, and another stream cleans from the fibre when it passes the knives, any pulp that has not been previously removed. After this simple process the hemp falls on an endless chain about 3 feet wide, which carries it back within a few feet of the starting point. These are all the particulars we are able to give of the machine, but we are writing to Messrs. Burn & Co., and will obtain from them further particulars, together with prices, etc., as the machine seems to be one which might prove useful for the defibrating of the native hemp, *insangu*, which grows so extensively in Natal. On receipt of particulars from Messrs. Burn & Co., we will make them public through the pages of the *Journal*.

Raisins in the Natives' Diet.

Raisins as a diet for mine boys has not proved satisfactory, so we learn from *South African Commerce*. At a recent meeting of the South African National Union a letter read from Mr. Lionel Phillips pointed out that the food value of raisins was small as they contain only vegetable salts and carbo-hydrates found in the sugar without any fat or proteids. The raisins also contain matter which is likely to cause internal irritation and digestive trouble. When the experiment of serving out raisins as part of the native rations was first tried it was hoped that a Cape industry might benefit considerably. The raisins were tried on a number of mines belonging to the Eckstein group, but medical men have pronounced against them as a regular article of diet. The fruit is being given to the natives as a luxury, and the consumption has therefore largely decreased.

American Methods of Grain Inspection.

The *American Hay, Flour and Feed Journal* for March contains an interesting article on the subject of grain inspection in Minnesota. We do not propose to deal with the whole of the article here, but the section describing the method of inspection deserves space for quotation here in full, especially in view of the proposals to establish grain elevators in South Africa and the consequent necessity for handling grain in bulk on the railways. All grain (we read) arriving at the terminal points except such as is billed to points beyond is inspected and weighed by the State department. On the arrival of the cars they are placed by each railroad company upon the inspection tracks provided for that purpose, in their respective railroad yards. In each of these yards samplers and helpers are stationed who are on the ground early every morning in winter and summer, regardless of weather, prepared to perform their day's duties. One of the helpers begins the work by breaking the railroad seal on one side of the car and throwing the car door open, first having made a record of the number of the railroad seal broken by him, and if there is any appearance of leakage in any part of the car, this is also noted. This helper continues his work until all the cars which have arrived during the night—sometimes 150 to 200 or more—have been properly examined and opened. The sampler then proceeds to obtain a sample of the grain by pushing a long brass probe into several places in the grain and each time draws up a section of the grain from top to bottom; these probings are all mixed together and placed in a sack with a ticket, showing car number and initials; the cars are then sealed with State seals, a complete record of which is kept by the Department; the samples are then sent by teams to the office and the inspectors determine the grade in the office from these official samples.

Stress is laid by the writer of the article in question upon one fact in particular, namely, that the inspectors in determining the grades know absolutely nothing as to the point from which the grain came, or whom the shipper may be, or to whom the grain may be going, notwithstanding the prevalent erroneous ideas on this subject. Nor would it be possible to furnish any such information from the inspection office, the writer proceeds, as the only record to be found there is the car number and initials, the date of inspection, name of inspector, the grade and dockage, and the inspector's notations or reasons for his grade. Thus every car load arriving is inspected with absolute impartiality, and without the slightest knowledge of its origin or ownership.

The Ten Commandments of Agriculture.

Dr. Seaman A. Knaff, who is in charge of co-operative demonstration work in the United States Department of Agriculture, has designed the ten maxims that follow, as the Ten Commandments of Agriculture. They are:—(1) Prepare a deep and thoroughly pulverised seed bed, well drained: break in the fall to the depth of 8, 10 or 12 in., according to the soil, with implements that will not bring the soil to the surface. The foregoing depths should be reached gradually. (2) Use the seed of the best variety, intelligently selected and carefully stored. (3) In cultivating crops, give the rows, and the plants in the rows, a space suited to the plants, the soil and the climate. (4) Use intensive tillage during the growing period of the crops. (5) Secure a high content of humus in the soil by the use of legumes, barnyard manure, farm refuse and commercial fertiliser. (6) Carry out a systematic crop rotation, with a winter cover crop on southern farms. (7) Accomplish more work in a day by using more horse-power and better implements. (8) Increase the farm stock to the extent of utilising all the waste products and idle lands of the farm. (9) Produce all the food required for the men and animals on the farm. (10) Keep an account of each farm product, in order to know from which the gain or loss arises.

Certain countries will organise in their respective sections at the Universal Exhibition at Brussels in 1910, a special exhibition of everything connected with the work of agricultural associations in their respective areas. Anyone wishing to participate in these exhibitions is requested to communicate without delay with the agents for the Brussels Exhibition in their respective countries, or, in default of any such agents, with the Commissariat general du Gouvernement belge, 12, rue de Berlaymont, Brussels.

Top Working Fruit Trees.

By O. B. WHIPPLE.

*Field Horticulturist, Grand Junction, Colorado.**

It is becoming more and more apparent that certain localities and soils are peculiarly adapted to growing particular kinds and even varieties of fruit. Commercial fruit-growing localities are making their reputation by being able to grow a few varieties well. So each new fruit country must go through an experimental stage when a host of varieties is being tested to determine those best adapted to its peculiar conditions. Then in the growth of each new fruit country there comes a time when the grower will have to solve the problem as to what to do with the undesirable varieties. Shall he pull them out or graft them over to better varieties? Systems of grafting-over old trees have long been practiced, and experience has proven that, if properly done, top-working brings quicker returns than the replanting of young trees. It is not uncommon to see a fairly good crop on the three-year-old top of a top-worked tree. Trees properly worked-over give tops as desirable and sometimes more so than trees of the same variety grown from first-class nursery stock.

Top-working as a means of establishing a weak-growing variety on a stronger root system than its own is now coming into favour. The Rome (Beauty) when on its own roots is, on the best soil, an indifferent grower; but, when worked on some strong-growing stump, it makes a very satisfactory tree. Some varieties of apple, susceptible to attacks of root rots, could, no doubt, be successfully grown on roots of varieties which are apparently resistant. The Northern Spy seems to be a striking example of an apple tree root free from the attacks of woolly aphis and is sometimes planted and later worked over to other varieties. Broken and diseased limbs may be saved by grafting, and progressive fruit-growers who desire to test new varieties can best do it by grafting a few scions into bearing trees.

Some years ago the fruit-grower looked upon the practice of grafting as a mysterious art and upon the man who went about doing the work as a sort of wizard; as a matter of fact, it is so simple that any careful orchardist can and should do it himself. All of our common fruit trees can be easily grafted or budded. The apple and pear may be inter-grafted upon each other and the same may be said of the peach, plum, apricot and almond. But in practice we do not carry on such wholesale mixing; it may be said that the apple and pear never make a good union.

* Condensed from Bulletin No 147 of the Colorado Agricultural College.

While such combination may unite, the union may not be perfect enough to make a good top. We would not expect the top-working of apple to pear or *vice versa* to be a success. The writer has seen peach grafts start very vigorously upon apricot, and plums upon peach trees. I have observed plum trees top-worked to peach with perfect unions and the ten-year-old tops bearing excellent crops of fruit. In this case, the combination seemed to result in a dwarfing of the peach top, though the growth is by no means stunted. So in practice, we stick largely to the intergrafting of different varieties of the same kind of fruit.

To understand the principles underlying graftage, the orchardist should know how the stems of our fruit trees grow. He should understand that growth in diameter only takes place in a very small region between the bark and sap-wood. This part of the stem is called the cambium. In this thin layer of tissue the cells are still active and capable of diversion, while the activity of each succeeding layer, on either side, grows less and less.

When the limb is split to insert a scion the cleft does not grow together along its entire length, as some may think. The cells in the cambium layer may produce a growth that may, to a certain extent, fill up the cleft and cover over the stub, but the tissues of the stock and scion only make a true union where the cells of the cambium layers of the two come in contact.

The important point in grafting is to see that the cambium layers of the stock and scion are matched at some point.

When growth is active we say the bark "peels." Budding is done during this period, not only because the ease with which the bark separates from the wood simplifies the work of inserting the bud, but as growth is more active the tissues of the bud and the stock are more likely to unite.

TOP-WORKING OLD TREES

In the working over of old trees it is well to bear in mind that trees which show a poor growth in the orchard are seldom worth the time it takes to graft them. This is very often true in the case of some varieties of apple. As a rule the weaker growing varieties are very unsatisfactory stocks upon which to work other kinds. Then the wisdom of top-working stone fruits would almost seem questionable. While good tops may be grown on either peach, plum, apricot or almond, it is doubtful whether these tops will bear much quicker returns than young trees set in the place of the old ones. Still we would not care to discourage a practice most successfully followed by some growers, but will say that only strong-growing young trees under the most favourable conditions are worthy of such an attempt at renewal.

METHODS OF GRAFTAGE.

Various methods of graftage may be employed in changing over the top of the old trees. Some method of scion-grafting is generally used, although it is not uncommon, in stone fruits especially, to bud into new growths. Of the methods of scion-grafting two are commonly used in the West: cleft-grafting and kerf-grafting. Those who have practiced grafting in the East as well as in the West claim that the wood of Western fruit trees is much more brittle and that on account of excessive splitting, cleft-grafting is more difficult in the West. This has led to the introduction of a new system which is locally known as kerf-grafting.

Cleft-Grafting.—The operation of cleft-grafting is very simple. The limb to be grafted is sawed off squarely, leaving a smooth, solid stump. The stub is split down about two inches with a grafting-chisel or knife. The chisel is removed and the cleft is wedged open with the wedge on the back of the knife or one provided for the purpose. The scion should be cut to contain three buds and should be of strong, well-matured wood of the previous season's growth. The lower end is then trimmed to a wedge leaving the first bud a little below the top of the wedge, and cutting the edge of the wedge opposite the bud a little thinner than the other. The scion is then driven firmly into place with the lower bud to the outside and a little below the top of the cleft, being sure to bring the inner bark on the outer edge of the wedge in contact with the inner bark on the stub. This is the important step in grafting, as it is between these parts that the union takes place. Sometimes the inexperienced grafter makes the mistake of setting the scion flush with the outer edge of the stock. On large stubs with thick bark it would be almost impossible to set a scion more illy matched than in this way. Some advocate setting the scion on a slant, the point of the wedge toward the centre of the stub. This insures a contact of the cambium layers where they cross and is a good suggestion, since a point of contact is sufficient for a good union. With a scion properly set in each edge of the cleft—providing the stub is large enough—the wedge is removed. This allows the cleft to tighten on the scions, the greater thickness of the outer edge of the wedge-shaped portion of the scions insuring greater pressure at this point. With the removal of the wedge the cleft should hold the scions firmly in place. Wax should now be applied to all cut surfaces, even to the tips of the scions. Special pains should be taken to see that the stub is well covered between the scions and the cleft waxed as far as it extends down on the sides of the stub. This prevents drying out, and it is quite important that it be thoroughly done.

Kerf-Grafting.—This system of grafting differs little from inlaying. The stub is prepared as for cleft-grafting, but instead of splitting, saw cuts are made on opposite edges of the stub and trimmed to thin V-

shaped grooves with a saddler's knife. The scion is then trimmed to fit, driven firmly into place and waxed as in cleft-grafting. With a little practice the scions may be set as firmly as in cleft-grafting. It is claimed that this method has the advantage in speed and that the scions are not as easily blown out in early summer. Scions are lost by both methods, and, if properly performed, one is probably as good as the other. It does have the advantage in that more scions may be set in large stubs and thus hasten the process of healing. The same care must be used in setting the scion to insure a union. The latter system seems especially adapted to working with stone fruits where splitting is even more noticeable than in the apple and pear. Sharp tools which give a smooth cut surface are essential in all grafting work.

Bark-Grafting.—Some advocate another method of grafting known as bark-grafting. In this case, the stub is cut as before, the scion is cut with a long bevel on one side and slipped between the bark and sapwood. It is generally necessary to slit the bark at the point of insertion, and very often the bark is removed from the base of the scion up to the top of the sloping cut. The stub is bound with waxed string or other material, to hold the scions firmly, and it is then waxed as in the cleft-grafted stub. The system really has no advantages over the others, unless when compared with cleft-grafting in working large stubs.

Terminal-Grafting.—Another style of grafting sometimes employed is that known as terminal-grafting. This work is generally done in the latter part of June or just as soon as new growth that has matured enough to show a terminal bud may be secured. On old trees, such wood may be found in June. A twig that has completed its growth may be picked out by the presence of a well-formed terminal bud at the tip and full grown, or practically full-grown terminal leaves. The scions are cut three or four inches long and the leaves practically all trimmed off. There are different ways of inserting the scion. The most common method is to cut a vertical slit in the bark of the stock, trim the lower end of the scion with a long sloping cut on one side, and then slip it under the bark at an angle of about 45 degrees with the slit. The cut surface of the scion should rest upon the wood of the stock. It is not necessary to wrap or even wax the wound.

The scions start into growth the same season, but the top of the stock is left until the following spring. The method seems to work well. It may prove a practical way of supplying lower limbs on young trees headed too high. When one neglects to remove the top when such grafting is done in the lower part of old trees, these scions readily form fruiting wood, generally bearing the third season. It is a suggestion that it would be the proper course to take as a means of getting specimens of new varieties in the shortest length of time.

Mixed Farming in Devonshire.

By **LOUDON M. DOUGLAS**, Lecturer on the Meat Industry, Edinburgh.

THE county of Devon is celebrated in England as being one which carries a larger proportion of cattle to the total acreage than any other. Its area runs to 1,666,839 acres, and in 1907 cattle of all sorts numbered 296,965. Three-quarters of the county is under cultivation, and more than half of this is permanent pasture.

The principal cattle which are kept in the county belong to the well-known Devon breed, and these have now become famous throughout the world as producing the best dual purpose cows. At one time the red Devon cattle were used as draught oxen, but for many generations they have been exclusively kept because of their beef and milk-producing qualities. It is, however, a custom amongst the better class of farmers to use also some Jersey cattle in order to increase the creaming qualities of the milk produced.

In this connection there are few farms in Devon, or, for that matter, anywhere else, which would compare with that owned by Messrs. Loram Bros., who trade as the Cathedral Dairy Company, Exeter, and at Rosamondford, Aylesbeare, Devon.

The great advantage of this farm is that it is utilised for dairying purposes; it also possesses a creamery, and the by-product from the milk are utilised to feed pigs. Hence there is a pig-breeding establishment, and in order to complete the process there is also a modern bacon factory, so that the best possible use is made of all the products.

The farm extends to 420 acres, and really is composed of two farms, namely, Rosamondford and Rill. They are about seven miles from Exeter, and lie in the great pasture area between that city and Ottery and Sidmouth.

The land of the farms is composed of red clay, and is stiff, and therefore capable of holding a large amount of moisture, which is an element in dairy farming not to be neglected.

The farm is carried on primarily for the dairy, and a succession of grain crops is produced. Trifolium and rye grass are grown in early spring; in the late spring vetches, clover, and maize are planted, and these carry the stock through until the winter, when roots become available, swedes being grown for the early winter before Christmas, and mangels for late winter and early spring.

It is customary to pass everything through the chaff-cutter and root-pulper, and no long fodder is fed, all the food, including roots being mixed before being given to the cattle, and the same principle applies to

the feeding of the pigs. The corn is cooked in winter, and a mixture of beans, maize, and wheat grains is fed to the cattle morning and evening along with chaff and roots.

The cattle consist of one herd of Jerseys and two herds of red Devons, and are chosen because of their milking qualities, for clotted cream. Records of the milk yield are kept morning and evening, and the quantities are weighed once a week. Cows which give under 600 gallons per annum are eliminated from the herds, and it is curious to note that some of the cows give 900 to 1,000 gallons, and these are common to both breeds kept. The rich colour of the cream is, of course, derived from the Jerseys.

One of the features of the farms is that grass land of 200 acres is given up to hay-making, yielding an average of about 350 tons per annum.

The treatment of the cattle is of considerable interest. They are turned out into the pastures, and remain out day and night from the first week in May until the middle of November, then they are taken up at night, but go to the pastures during the day. They are, therefore, on the pastures every day all the year round, which is an essential feature, so that they can have sufficient exercise.

There is plenty of water on the farms, which is derived from streams. The rainfall averages about 32 inches per annum, so that the conditions are as well as they could possibly be.

The work of the farm is carried on by eight horses, and a two-horse wagon is used daily to carry the milk to the central distributing depot in Exeter.

As has been mentioned, the principal business is the production of Devonshire clotted cream, and in this respect these farms are celebrated inasmuch as the dairy produces the largest quantity of clotted cream of any one farm in the United Kingdom.

The process of manufacturing clotted cream has been described as follows:—

“The principal part of clotted cream-making lies in the scalding and cooling. The milk is brought in and immediately placed in flat tinned vessels holding easily two gallons each. The milk is “set” in these pans. The pans are then placed in a hot water bath, capable of taking a great many at a time. They are immersed almost to the rim, fitting exactly into openings in the bath. The water is heated by means of a steam coil, and the milk is not raised above 180 degs. Fahr. The heating continues for a quarter of an hour, and, of course, much of the fat rises to the surface, but all of it does not do so until the cooling process begins. The pans are placed in a large, well-ventilated room, and as their contents gradually cool, the almost total separation of the cream takes place, nearly all of it rising to the surface. When the normal temperature is attained,

it will be observed that a thin film covers the top of the cream, and seems to bind it together. This film may be some trace of casein forced to the top, but in any case it acts as a binder in such a way as to enable the cream to be set in dishes firmly. When cold, the cream is skimmed off by means of a strainer and placed in separate dishes, when it is ready for use. The whole process is a simple one and does not involve much skill. It is necessary, of course, to exercise great care in having all the vessels quite clean. The heating should be done quickly as indicated, and the temperature should not exceed 180 degs. Fahr."

Devon and Cornwall have, from time immemorial, had the monopoly of the clotted cream industry, and attempts to produce the same product elsewhere have not been successful. It is said that the business began in the time of the Phœnicians, who came to Cornwall and Devon in search of tin, and brought with them the utensils used in the East for making clotted cream, and with very little variation the same processes as used by them are carried out to the present day. The banks of the Tamar have many classic relations, but not better known throughout the world than those associated with Devonshire cream:—

"Oh, nothing on earth or in poet's dream
Is so rich and rare as your Devonshire cream,
It orient tinge like spring-time morn,
Or baby buttercups newly born;
Its balmy perfume, delicate pulp,
One longs to swallow it all at a gulp,
Sure man had ne'er such gifts or theme
As your melt-in-the-mouthy Devonshire cream."

The creamery, besides producing Devonshire cream, is also utilised as an ordinary butter factory, and possesses the usual equipment, that is to say, it has a scalding tank, pasteuriser, coolers for water and in connection with them a refrigerating machine. Whatever surplus milk is not utilised in the manufacture of clotted cream is devoted to the manufacture of butter.

The refrigerating machine which is used is of the Douglas type, and the refrigerating agent is the low pressure sulphurous-anhydride, which is so adaptable to dairy purposes owing to the fact that it is easy to control and takes very little power to work it.

The whole creamery is a complete illustration of what may be done on an ordinary farm, and in itself would be a complete business.

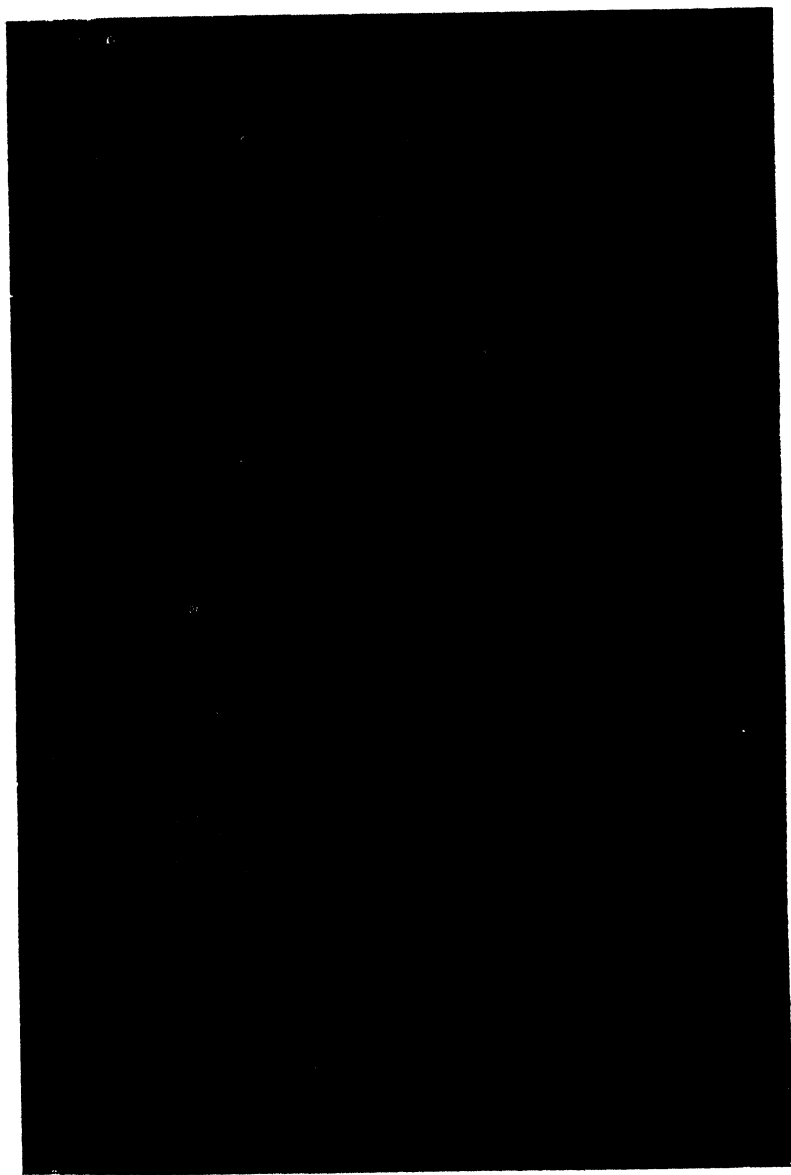
The utilisation of the by-products, however, has forced itself upon Messrs. Loram, and it occurred to them that while their large depot at Exeter could dispose of butter and cream, there seemed no reason why it could not also dispose of bacon and pig products from the farm, and for

this reason it was decided some years ago to adapt a large portion of the farm to the breeding and fattening of pigs, with a view to utilising the separated milk and ultimately producing bacon. As a matter of fact, they were driven to this course in order to utilise this by-product successfully. Hence we find that to-day a regular stock of 200 pigs is kept, and there is also a breeding establishment with twenty-four breeding sows, from each of which five litters in two years are obtained. The varieties are Middle York, Berkshire, and Large Black. The parents are pure bred, but the progeny are crossed: white on black, and black on white, boars of each breed being kept.

It is usual to feed the pigs in summer on milk and sharps, both breeding sows and growing pigs being fed in that way. For six weeks, however, before the pigs are slaughtered they are penned in and fed on milk and barley *ad lib.*, and also a ration of milk and sharps which has been sodden in a tub. A quart of cod liver oil is added for every twenty pigs, so as to restore the fat taken out of the milk. The pigs are matured at a dead-weight of 180 lbs., and are cured on the Wiltshire system, that is to say, after the pigs are slaughtered they are scalded and cleansed. They are then split into sides and cooled, after which the sides are pumped with a recognised curing pickle, the pumping being greatest in the fleshy parts, namely, the gammon and shoulders. The bacon takes about fourteen days to cure, and is then ready for smoking, this being carried out by means of oak or other hardwood sawdust. The sides are then dried with the assistance of gill pipes, through which steam circulates, and may either be sent out in the dried state or smoked. The products of the factory are: Sides, three-quarter sides, middles, shoulders, and hams. The process of curing is that which is generally carried on in other bacon factories, with the exception that the sides are usually cured for five days in pickle to which certain condiments have been added. Hams, of course, take somewhat longer to cure, and have to be treated rather differently, but the main part is practically the same as with bacon-curing. All these products are disposed of in the Exeter depot, and an increasing business is being done from year to year. It has also been found that in the bacon factory there were a number of by-products, and, carrying out the principle which had first of all driven Messrs. Loram into the bacon-curing business, they also recognised that it was necessary to utilise these by-products in the same way. Hence there is a large production of sausages, hogs' pudding, and similar small goods, for all of which there is a ready sale.

The plant in connection with the dairy and bacon factory was supplied by Messrs. William Douglas & Sons, Ltd., of Putney, London, who were also advisers to Messrs. Loram in the construction of the buildings.

Part of the farms is devoted to the growing of fruit, and there are



PASPALUM VIRGATUM — L.

Six months from sowing of seed. — Photo taken in Botanic Gardens, Maritzburg, and kindly supplied by the Curator, Mr W. E. Marriot.

considerable orchards, from the fruit of which it was the custom at one time to make cider. Recently, however, it has been decided, with considerable success, to utilise the fruit of the farm for preserving. Hence large quantities of raspberries, currants, plums, apple jelly, etc., are produced and sold in bottles, all of them being packed, with the exception of the jellies, in a light sugar syrup. The bottles are stood in a Douglas canning vat for twenty minutes, so as to render the liquid sterile, and after such treatment the fruit will keep for an indefinite period.

It will thus be seen that these Devonshire farmers are utilised up to the hilt, there being no waste of any sort permitted, and their great success is doubtless due to the fact that the best possible use is made of every product. It is an object lesson which may well be copied in many countries, and is certainly one of the best which could be taken from the United Kingdom.

Mercurial ointment (blue), purchased ready for use, is valuable to promote the growth of hair, and in some forms of skin disease; only small quantities may be applied.

THE FATE OF OLD MACHINES.—When a farm machine is worn out or becomes out of date and is no longer serviceable, what is it fit for? Perhaps the answer will be scrap iron, and if that is its only fate let it be turned into scrap iron, for as such it will bring a little back to its owner; but, judging from what one sees, there seems to be some peculiar and unexplained sentiment which protects old machines that cannot be put to any practical use. We are prompted to write in this strain, remarks the *Mark Lane Express*, through having seen on more farms than we care to name old machines in the way of mowers, tedders, rakers, ploughs, harrows, etc., standing in corners of stackyards or outside buildings more or less buried in beds of nettles and falling to decay bit by bit. If the idea in such cases was to make up a museum of out of date implements, the latter should be put under cover, but we see no object in letting them stand outside to rust or rot away. The presence of derelict machines lying about a farmstead give the place a neglected and untidy appearance, and the impression is created that nobody cares. We are not sure that all the old machines thus thrown aside are quite worn out, and if tinkered up a bit they might, perhaps, serve somebody a good turn; but assuming that they are no longer of any use whatever, they would be better in the hands of the old-iron merchant than left about the farm premises to become an encumbrance and an eyesore.

Cement and Concrete Fence Posts.

By H. M. BAINER and H. B. BONEBRIGHT.*

(Continued from Page 249.)

POURED POSTS.

THERE are two general classes of mixtures which may be used in the construction of posts; the poured and the tamped: In the poured mixture, enough water is used in mixing to make it thin enough to pour from a pail or scoop almost like water. The mixture is poured into mold and allowed to remain in it until it has set, which is from one to five days, depending upon the time of year and the weather. In drying summer weather, from one to two days is usually sufficient. In cool or damp weather they must be left in the molds much longer.

In order to make several posts of the poured type at once, it is necessary to have several molds ready for use. With six molds only six posts could be made at once, and it would be necessary to wait until the cement was set before six more could be made.

It was found that to make a good poured post, the mixture should be stirred or shaken immediately after placing in the mold. This should be done carefully to prevent displacement or reinforcement wires. This helps to remove the air from the mixture and makes a post of smooth finish.

The experiment showed that a poured post of a certain mixture was stronger than a tamped post of the same mixture. It is enough stronger to justify anyone in constructing it in preference to the tamped one at the necessary additional expense for molds. The poured post is smoother, more nearly impervious to water, not so hard to cure, stronger, somewhat more expensive, and can be better recommended than the tamped one.

TAMPED POSTS.

The tamped post is one in which the mixture contains very much less water than the poured one. It contains just enough water to make it hold together well when tamped. In the manufacturing of this type of post, only one mold is necessary. The mixture is tamped into it, and the sides of the mold can be removed immediately, the post remaining on the bottom piece until the cement has set. Thus the same mold can be continuously used for making as many posts as are desired. The necessity for but one mold makes this type of post less expensive than the poured one. The results of the tests made show that the tamped post is inferior to the poured one and cannot be placed in an equal class with it.

* Experts in Farm Mechanics, Colorado Agricultural College, U.S.A.

On account of less water being used in the mixture for a tamped post than in the mixture for a poured one, the tamped post requires more water and attention in curing. It is of more open texture, less impervious to water, not as strong, and not as desirable as the post of the poured type.

POST MOULDS.

In general, the molds in which cement or concrete posts are made may be divided into three main classes.

First, those molds which are designed exclusively for manufacturing tamped posts.

Second, those which are made exclusively for manufacturing poured posts.

Third, those which may be used for either tamped or poured posts.

In the first class of molds we find mostly the heavy cast iron forms which are built of strong and heavy material. The most of these molds are designed to be laid upon pallettes or upon a smooth floor. The mixture is first tamped in the mold to a depth of about one inch. The reinforcement is then placed and the mold is next filled, and the mixture tamped, so that only about one inch of material remains to be filled in. The second set of reinforcement wires is put in place next and the mold is tamped full to overflowing. The last step consists in smoothing off the top of the post with a trowel and removing the mold. This is done by unfastening some form of hook or clasp, slipping the sides of the mold a little distance away from the post, and then removing the molds to the position chosen for the next post.

The principal advantage of these molds lies in the fact that they being made of heavy iron need no centre stays. This gives greater speed in operation, due to the fact there are no cross pieces to interfere with the placing of the reinforcements, the tamping of the mixture, and the smoothing off of the top of the post at the finish.

The cast iron molds, being heavy, are rather hard to handle, and this feature, in connection with the high price of them, explains why they are not more commonly used.

In the second class of molds (molds for poured posts) we find a far greater variety. The more common forms are made of sheet iron, either galvanised or plain. For posts having a continual taper from top to bottom, sheet iron molds prove very satisfactory, providing sufficiently heavy material is used in their construction. A mold made of thin iron soon loses its shape and the posts made in them are necessarily unsightly. If properly taken care of, there is no advantage whatever in galvanised iron molds over those made of plain iron.

The advantages of the sheet iron mold are many. They are light to handle and easy to keep clean. If properly made they are nearly water-

tight. This insures the user against the possible loss of cement by leakage. As the cement travels to some extent with the currents of water, it can easily be seen how a leak in a mold may materially weaken a poured post by allowing a portion of the cement to be carried out of it. Another marked advantage of the sheet iron mold lies in the fact that the surface being smooth imparts a very smooth, glossy finish to the surface of the post. This not only adds beauty to the post, but aids in keeping out water, which might otherwise enter the cured post.

As the sheet iron molds are made in one piece, no pallette is necessary. At first glance this looks like a great advantage, but upon further consideration we find that the mold must be left upon the post until the mixture has set to such an extent that the post may be removed and handled without fear of breaking. In hot weather the post may be removed after 48 hours, but in cold weather a much longer time is required.

In making poured posts in these molds exactly the same process is followed as with tamped posts in molds of the first class just described; with the exception that the mixture is not tamped and greater care must be exercised in preventing the reinforcement from being misplaced.

Some forms of wood molds are made and used for the purpose of making poured posts only. Any desired form may be given to the post by properly shaping the mold. This point in favour of the wood mold is an extremely important one, as it permits the post to be made of uniform size from the bottom to the ground line, but with a rapid taper from this point to the top. Then, too, the sides of the mold may be removed after twenty-four hours and used again in connection with other pallettes; while the post, which has not yet become sufficiently strong to be removed from the pallette, lies unmolested in its original place until it is ready to move. This enables the maker of cement or concrete posts to produce at least twice as many posts with wood molds as with the same number of sheet iron molds, providing the required number of pallettes are at hand. The number, as well as the extent, of leaks in a wooden mold will depend upon the accuracy of construction, the care with which the molds are handled, and the care with which they are put together before filling.

The third class of molds (those which may be used for making either the tamped or the poured posts) are much the same as the wooden molds for poured posts, except that they are stronger. A mold which is to be used exclusively for manufacturing poured posts may be made of $\frac{3}{4}$ -inch material and prove strong enough for the purpose; while if the mixture is to be tamped within the mold, at least $1\frac{1}{2}$ inch material must be used. The extra thickness is required to prevent the molds from bulging at unsupported places during the tamping process.

The heavy cast iron molds could be used in making the poured posts as well as the tamped ones, but their original cost make them impractic-

able. The wooden molds serve the purpose equally well and are much cheaper.

Selecting the Mold.—The first and most important point to be considered in selecting the mold is the *shape and size* of it. Too many post mold manufacturers are turning out forms of molds that make "freak" posts, simply because it happens that they can manufacture them more easily and cheaply. It must be remembered that cement or concrete posts are made for long continued service and that simply because a certain mold works well is not a sufficient reason for purchasing and using it.

Next to the shape and size of mold we should look for ease of operation. Too many complications are likely to prove to be hindrances to the speed with which posts may be turned out. The simple mold almost always proves to be best, providing it has sufficient strength.

Care of Molds.—Before the molds are used they should be well coated with some kind of heavy oil. Crude petroleum is perhaps the best and cheapest material for this purpose. In case the petroleum cannot be obtained, a good oily mixture may be made by stirring about two pounds of axle grease into a gallon of gasoline. This mixture is applied to the molds with a brush. The gasoline evaporates, leaving a thin coat of axle grease spread over the entire surface of the mold. This oily mixture should be applied to the outside as well as to the inside of the mold, which makes it impossible for any of the material to cling to it. With the iron molds, the oil prevents rusting. In case the molds are made of wood, the oil helps to keep out the moisture, thus preventing shrinking and swelling, and also making them easier to keep clean.

As soon as the mold is removed from the post all material sticking to it should be scraped off and the inside surface covered with a thin coating of oil. In case tamped posts are being made, the oil need not be applied oftener than once for ten or twelve posts; but with poured posts, the oil should be applied each time the mold is removed. Great care should be taken not to allow the molds to become bruised or dented, as it not only causes the posts to have a bad appearance, but allows the mixture to adhere to the uneven spots; thus a great deal of unnecessary trouble is experienced in removing the posts from the molds.

If the molds are not to be used for a time, they should be thoroughly scraped and oiled, inside and out, and carefully laid away. When it is understood that the speed of operation and the value of the posts depend largely upon the condition of the molds, the importance of properly caring for them will be readily understood.

(To be continued.)

No matter how cold the weather, sheep should have water daily..

The Living Bee.

By MARY RITCHIE, .

President, Natal Bee-Keepers' Association; Natal Expert, South African Bee-Keepers' Association.

(Continued from Page 290.)

XXI.—SECTIONS.

As soon as sections are completely capped they should be removed from the hive, as they are never so white as when first finished. Those in the centre, next the bait comb, will be finished first, being in the warmest place of the super. When these are removed push the next rack up to take its place and so on; move them one step up as you would in cooking girdle cakes. Replace all sections at once; leave no empty spaces, or time is lost, as the bees will build to the roof of the hive and cause much troublesome work later on.

Sections should be removed when completely capped, *but not before*. If beginners would only realise that it is easier to remove fully capped sections than half-finished ones we would see far fewer half-finished sections on the market. The explanation of this is that the bees leave the honey cells as soon as sealed and cluster elsewhere—a quite necessary precaution in the hot weather. A basket or box with bee-proof lid is necessary if the bee-keeper is to have the honey and not the bees.

Sections should be carefully graded and only the best sent to market. This is of the very greatest importance. In England each section is carefully lace-papered, very often glazed as well—the maximum of trouble for the minimum return. In America a cardboard carton or transparent wrapper is often used.

Owing to the increasing cost of timber it seems probable that the wooden section will come to be discarded altogether. The rough handling in transport in a country like South Africa is all against them. We must adapt ourselves to conditions and become reconciled to chocolates in tins, instead of prettily coloured boxes and honeycomb in bottles instead of snow sections. It may taste as good, but it does not look so fair.

To prepare and put on sections is easy enough, at least after a little practice, and if the honey-flow is good the bees will see to the filling. When the time comes to remove them then comes the tug of war. It would appear so at least at an apiary we visited lately. The bee-keeper was out, but the trail of foundation-filled sections from the hives to the house were eloquent of defeat, and clearly spelt s-t-i-n-g-s. We guessed twelve, but the true number, it afterwards transpired, was thirty-six!

Another friend tried the Porter escape board, a new patterned one with a slide which, if left open, allows the bees to come back again. The principle of the escape is that the bees being shut off from their queen will immediately seek her, and the honey may be taken off meanwhile. The directions say that the trap should be put on in the evening and removed the morning of the following day. The beginner failing to grasp the meaning of the escape, and thinking once it was on it could be taken off when he was ready, allowed a week to elapse. Alas, what was his dismay to find that the bees had returned, uncapped all his beautiful white sections, and taken all the honey downstairs! And all that was left was a bitter lesson learned in the hard school of experience.

Honey should be marketed at once, but, if this is impossible, stored in a warm, dry place, safe from ants. Whatever you do, do not attempt on the advice of the American bee-papers to bleach them in the sun. This spells disaster, sudden and complete. The South African sunshine works so thoroughly that they become so absolutely transparent, so absolutely non-existent, that the light passes easily too and fro, and the golden honey streaming from the quickly melting wax is a picture without words but eloquent in its way!

At the end of the season—the coming of the cooler weather—all sections should be removed whether finished or not, and the space, if required by the bees, filled up with shallow frames. All half-finished sections should be carefully stored, to be used as bait sections in the spring. As Mr. Danzenbaker puts it, they are better than money in the bank. Any that are very near completion should be given to the strongest colonies to be finished off quickly by the bees that are still working upstairs.

Extracted Honey.

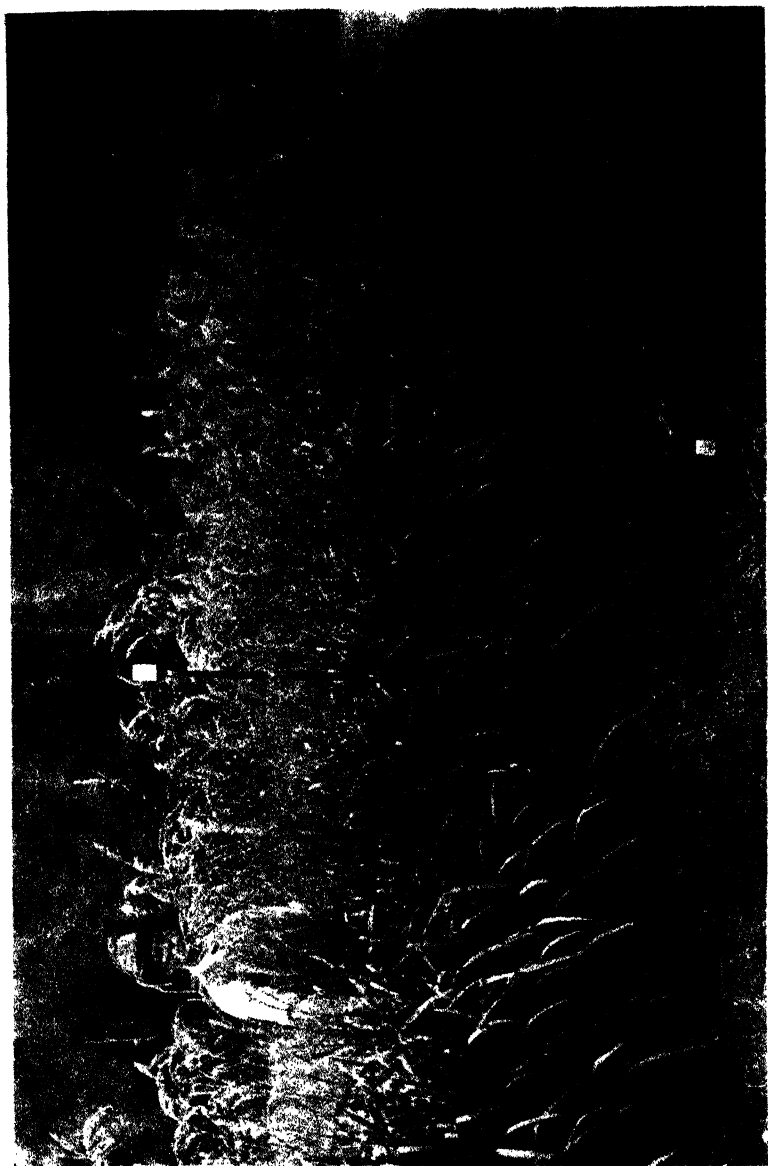
The sooner honey is taken from the hive, the lighter the colour, and the longer it is left on the thicker the consistency and the finer the flavour; besides being richer in flavour, fully sealed combs are the easier removed. To secure ripened honey from half-sealed frames, extract twice—first, before uncapping, this thin unripened honey may be fed back to the bees, and the second extracting gives the ripened saleable honey. Personally, I think half-sealed combs should be left in the hives. The simplest way to remove extractor frames is by means of the Porter escape board, either one board for each hive as the bee books say, or, simpler still, one board for every five hives. Pile the extractor supers containing the extractor frames brushed partly free of bees, one above the other on a bottom board, *made perfectly bee proof*, or an upturned roof, if Danzenbaker. Put an escape board on top of the pile and a brick to keep it from blowing away; be sure the circular hole, in this case, is on the lower side! and leave till afternoon. This may appear slow, but

is really the quickest way, as the bee-keeper can be busy with something else whilst the bees are clearing back to their own hives. It is quite amusing to watch them popping out, and invariably, on discovering they are free, deciding to return to the sweets. A second thought and they are winging their way back to their own hives. The supers should, however, be brought into the warm honey room before sunset, otherwise the honey will be thick and difficult to extract.

In the bee-appliance catalogues a comb-bucket is advertised in which to carry shallow frames from the hives to the honey house. The frames themselves seem to me sufficiently heavy without the addition of a bucket! An empty super with two light muslin trays, one below and one above, serves the purpose excellently. Such a tray is easily made from the frame sent out with each crate of hives, by tacking over it a piece of strong muslin. If carefully done it is not only light but bee-proof. The muslin may be damped to keep down the smell of the honey.

In removing extractor frames it pays to take every precaution against robber bees. We begin with the foremost hive and work backwards, thus keeping behind the hives we have handled. Now and again the bees discover us; either the breath of the smoker or the smell of a rag in the fuel basket give us away and down they come to demand an explanation. We explain how much cooler they will feel without all this hot honey, that now they will have room to breathe, etc., etc. "Cooler," they buzz, "cooler, cooler, cooler." Hotter! hotter!! hotter!!! it feels, and we grow redder! redder!! redder!!! as sting after sting tells us another martyr has thrown her little life away. At last we are forced to play "statues" till they leave us. We remove all frames that are thoroughly sealed, leaving the few that are not capped over, and in every case the two outer frames, whether sealed or not, to keep up the cluster and encourage them to begin on the returned frames without loss of time.

The question is sometimes asked, "Which pays best, comb or extracted?" A dairyman does not ask "Which pays best, milk or cream?" but supplies as much as he can of both. It is the same with the honey; shallow frames and sections can be worked together with advantage to both. If mostly sections are desired, for instance, shallow frames on the two outer sides of the super next the wood, especially if containing honey, will bring up the bees. Or, again, in running for extracted honey, two racks of sections in the centre will answer the purpose of an excluder and help to keep the queen downstairs. With regard to excluders or no-excluders, there is much to be said on both sides, as the old scholar said in "Middlemarch," but the frames filled over excluders are undoubtedly a greater pleasure to handle.



PASPALUM VIRGATUM.—II.

Paspalum virgatum with *Phalaris bulbosa* the same age in the foreground.—Photo taken in Botanic Gardens, Maritzburg, and kindly supplied by the Curator, Mr. W. E. Marriot. Readers interested in the introduction of new fodder plants are referred to Mr. Marriot's article on the subject which we published in our January issue (page 32).

To extract in comfort the room must be absolutely bee-proof, and here again every care should be taken not to leave wax or honey' around to upset the bees. For those who have not seen the operation, I may describe that the frames are first carefully uncapped on both sides and inserted two at a time in the extractor. The large metal can encloses revolving cages to hold the frames. A few quick turns of the handle and the honey, thrown from the cells by centrifugal force, runs in myriads of golden drops down the inside of the can. The empty frames quite intact, and light as a feather, are put aside and carefully covered to be put back on the strongest colonies either that or the following evening.

An exciting moment follows. In bee-keeping there are many exciting moments. When we peep, for instance, into the hive to see if the young queen is laying, to see if the frames are whitening in the spring, to see if the bees are in the supers, if the honey is coming in, if the sections are capped. *The* moment in extracting is to see the colour of the honey when it flows from the tap. Is it light, is it clear? Look at it through the light. Will it win the first prize at the Show?

It is best to separate the sows at least ten days before they are due to farrow, and give them separate quarters.

A good dairy cow, if properly fed while dry, will lay on a considerable amount of fat, and after freshening she will not only use the food given her for milk production, but will draw on her own body fat to increase the milk flow, and no matter if you feed her practically all she will eat from the time she drops her calf, there will be a gradual falling off of flesh for six or seven months after she has calved.

SYMPTOMS OF HIGHER PRICES FOR SUGAR.—Under this heading the *Louisiana Planter and Sugar Manufacturer* of the 26th February has the following paragraph:—"In the *Havana Post* of the 18th inst. it is reported that a well known sugar broker gave a sugar factory owner \$5,000 for an option on 50,000 bags of sugar to polarize from 95.5 to 96 for delivery before March 31st, at six reales per arroba, which means three cents per pound in Havana, the current quotation for delivery during the first half of February having been 5.5/16 reales per arroba, or about \$2.67 per hundred pounds. Reports of the same date from New York indicate sales there of sugar at \$2.81 per hundred pounds, including cost and freight. This item is given to show the innate strength of sugar in the Cuba market and the belief of some of those most familiar with the market that prices will reach a considerably higher level."

What is Dry-Farming?

By DR. WM. MACDONALD,

Dry-Land Agronomist, Transvaal Department of Agriculture.

*(A Paper Read at the Dry-Farming Congress held at Klerksdorp on
March 11th and 12th, 1910.)*

IN modern agriculture there has been nothing more dramatic than the sudden rise of Dry-Farming—a science which is destined, in the near future, to play a far more important role in rural development than even the great art of irrigation. Now as some mystery still exists in the minds of many as to the real nature and scope of this type of farming, the following notes may be of value:—At the outset it may be said that dry-farming differs very little from the ordinary farm practice which has been followed by the best and most successful farmers in all parts of the world since time imemorial, save that special stress is laid upon the conservation of soil-moisture and the growth of drought-resistant crops. But although the principles of dry-farming have been known and practised for many centuries, it is only lately that it has aroused a widespread interest amongst all sections of the agricultural community. It is sometimes stated that the success of dry-farming depends upon a particular sort of soil. But this is not so. For dry-farming has proved profitable alike upon shallow sandy soils and heavy clays. Of course, on the best lands—such as deep rich loams—larger yields may naturally be expected. Again, some farmers seem to think that this new practice depends on the possession of special agricultural machines. But this is not the case; the four essential implements being the plough, harrow, cultivator, and drill. However, with more machinery and especially harrows, the farmers will be better able to pulverise the soil and so secure a good seed bed, which is most important. The only new implement specially devised for dry-farming is the “Sub-surface Packer.” But even this is not essential, and a disc harrow will do instead. It will thus be seen that the equipment required is well within the means of the majority of farmers.

The term “Dry-Land Agriculture”—since shortened to “Dry-Farming”—originated in Western America, and may be defined as the “Conservation of Soil-Moisture during long periods of dry weather by means of Tillage, together with the growth of drought-resistant plants.” It is not, of course, farming without moisture, for that would be plainly

impossible. The phrase is now widely and loosely applied to farming in all places where the normal rainfall ranges from 10 to 25 inches per annum. In the words of the American Dry-Farming Congress dry-farming is farming where "irrigation is impracticable or impossible." In selecting land for dry-farming the most important point is the depth of the soil. This can easily be found out by digging pits five to ten feet in depth, or by looking at cuttings, wells, and embankments. In a new country it is well to take careful note of the growth and root system of native trees, shrubs, grasses, pod-bearing plants, etc. In South Africa mimosa trees and anthecaps are usually safe guides to a good deep soil. The reason why a deep uniform soil generally produces a far better crop than a shallow soil is that it is possible to store a much larger amount of water in the former, and, further, the soil-moisture rises much more freely from great depths to the root system of the growing crop. Given a good soil, therefore, the dry-farmer has simply to prepare his ground to receive all the rain which falls upon it, and, secondly, to prevent the loss of soil water through evaporation.

How then can moisture be conserved? The answer is: by deep ploughing, constant cultivation, and the prevention of evaporation. Ploughing is the most important operation in dry-farming, and upon it will mainly depend the success or failure of the crop. The dry-land farmer often asks, "How deep should I plough?" and again "What is deep ploughing?" Usually deep ploughing means anything from seven to ten inches and over. In dry-farming deep ploughing is strongly to be recommended for several reasons; it increases the water-holding capacity of the soil, admits sunlight and air, extends the root feeding area, prevents light land from being blown away, encourages the growth of soil bacteria, prevents surface washing after heavy rains, and, lastly, enables plants to successfully withstand long periods of drought. Broadly speaking, a soil that is best suited to dry-farming is also one that may be ploughed deeply, but the best results have so far been obtained on deep, uniform sandy loams.

Next, let us suppose that we have stored practically the whole of the last heavy downpour in our deep mellow ploughed lands. How can it be kept within the soil for the use of the crop? The reply is: With the harrow and cultivator. The moment the ground is dry enough to be worked, go over it with a harrow when the field is bare, or with a cultivator if in crop. Oftentimes, a growing crop may be harrowed with great advantage, as, for example, wheat or maize, while the plants are still young and flexible. The result of stirring the soil in this manner is to form a Soil-Mulch which effectively prevents loss of water, that is, evaporation from the surface of the soil. Any material which is spread upon the soil to shade the surface from the sun, and so check evapora-

tion, is termed a mulch. A soil-mulch, therefore, is merely a soil-mantle. In gardening operations, leaves, manure, coarse hay, straw, and grass are commonly used. Such mulches are very effective—even more so than a mulch of fine earth—but they hinder the continual stirring of the land, which allows the air and sunlight to penetrate into the soil and set free plant food. Accordingly, the most useful and practical mulch in dry-farming is that which is made of loose, dry soil. This brings us to the Moisture-Saving-Fallow. Formerly, the fallow was meant to designate a piece of land left without a crop for a year or may be more. It was allowed to “weather.” This untilled land often became hard and baked, and weeds of every sort grew merrily upon it. Now, weeds are the robbers, not only of plant food, but also of moisture, and a Hard Soil means that the rain cannot penetrate, while the loss of soil moisture through evaporation is very great. But in dry-farming the Conservation of Moisture is the all important problem, and this led to the adoption of moisture-saving-fallows, deeply ploughed in the first instance, and constantly stirred thereafter to prevent the formation of a soil-crust. These well-tilled, weedless lands will retain the rain for an indefinite period and so insure the dry-farmer of a sufficient supply of moisture for his future crops. Thus, side by side with his growing crops, the dry-farmer should lay off Moisture-Fallows, which may be maintained for periods of three months, six months, or one year. The tilling of these fallows results in four things, *viz.*: (a) Storage of rainfall; (b) destruction of weeds; (c) admission of sunshine and air; (d) encouragement of beneficial soil germs.

Another matter of importance is Thin Seeding. Most farmers sow far too much seed, forgetful of the fact that every superfluous plant is robbing the land of moisture. It is plain that thick seeding, such as ninety pounds per acre, will call for three times the amount of water as, say, thirty pounds. Moreover, where the seed is too thickly sown all the moisture is liable to be used up near the surface, with the result that the tender plants are burned up before they have had time to send their rootlets into the deeper earth. Further, Few Varieties. In the Transvaal the dry-farmer grows too many sorts of grain. A vigorous effort should therefore be made to eliminate as quickly as possible all inferior types and to concentrate upon one or two. The dominant dry-land winter wheat of Western America is Turkey Red, while the Durum varieties are the dominant spring types for dry-lands. So it behoves the farmers throughout South Africa to agree upon a few dominant types, to keep them pure, to plant only selected seed, and thereby establish a high grade uniform standard for both wheat and maize. Finally, it may be said that success in dry-farming will depend mainly upon six factors: (1) Deep ploughing; (2) thin seeding; (3) frequent harrowing;

(4) weedless lands; (5) few varieties; (6) moisture-saving fallows.

The most fatal error in modern farming is the careless preparation of the ground. Poor, shallow ploughing and the lack of after-cultivation of the soil are the two factors to which crop failure is largely due. It is impossible for any plant to withstand a severe drought when its roots lie in hard, dry soil. But put the same seed in deep, mellow earth, with a moisture-saving mantle, and it remains green after weeks of rainless weather. In the past the great mistake in South African agriculture has been over-irrigation, with little or no cultivation, and the soil soon becomes stagnant with a surplus supply of water. Sunshine and air are excluded, the fertility of the land impaired, and the root system of the crop often permanently injured. When farmers realise that most crops can be successfully grown on dry lands merely with good cultivation, they will hesitate before embarking upon expensive irrigation schemes, and will seriously study the problem of better tillage.

Generous treatment of brood sows always pays in the increased thriftiness of the pigs.

Sweet food is always better for growing pigs than that which has fermented or soured.

The real test of the good cow is her performance after the first three or four months in milk.

The pig is so sensitive to the cold that it will completely bury itself in the bedding to keep warm if the shelter is inadequate.

Since their value depends to such a great extent upon their disposition, good horses at least should be handled by those who know how to do it.

A good currying occasionally does not make a sleek horse. It takes everyday grooming to open the pores, soften the skin, and produce a good, healthy, sleek coat.

A farmer recently made the remark that the big, fat cow was never anything but the big, fat cow, and would never do much at filling the milk-pail. That is not the kind of cow to choose for milk. Fat will not stay on the real dairy cow; it will slide right into the milk-pail in the form of milk.

Some Wattle Insects.

By CLAUDE FULLER.

THE WATTLE BAG-WORM.

OPINION differs materially among wattle-growers regarding the Bag-worm's status as a pest. Some regard it as the worst insect enemy of the wattle, while others do not rank it with several beetles and are much less concerned about it than the trouble popularly designated "frog-hopper."

Conversing recently with the manager of extensive plantations, a gentleman who may be said to have had a life-long experience of wattle culture in Natal, I learned that whilst he fully appreciated the damage done to wattles by a gross attack of Bag-worms, he had not found that these insects did permanent mischief to the trees which, after the attack was over, recovered. Where they did give trouble, he told me, was when stripping coincided with abundant infestation, because then the bark did not peel evenly nor readily.

This lead me to ask, "Do you find that the attack culminates and then suddenly ceases?" I not only received an affirmative reply but an offer to be shown a plantation now free from attack which eighteen months previously had been invaded and defoliated by Bag-worms. This plantation was at once visited and found in good growth. At the time, February, the bags of this season's brood were of full size and quite conspicuous on account of their colour, but none were seen amongst the foliage of the trees viewed from the outside of the plantation. Entering the plantation countless weathered bags festooned the bare, dead twigs, the growth of the previous summer. It was obvious that some circumstance had arisen to check the insect attack, and it was soon found that practically every bag had been torn open by some powerful agent and the inmate removed and destroyed.

In order to get a more exact idea of the thoroughness with which this unknown ally had carried out its work, a number of bags were pulled off haphazard from the trees in passing, 112 being obtained. All were carefully examined, and only 14 were untorn. Of these, one was an immature bag; three were the bags of males from which adults had escaped, five were certainly female bags, whilst the remaining five were doubtful. Of these fourteen bags, from what could be seen and from what is known, it is extremely probable that the inmates of 11 had succumbed to other causes before the advent of the destroyer.



Twig of Wattle showing girdling by Bag worms. Sketched from nature. From the girdle marked A the Bag had disappeared.

It was noticed that the males had obviously emerged before the destruction of the females, as remains of their protruding pupa shells were not infrequent seeing that nearly 18 months must have elapsed in the interim.

Now, these males must have emerged late in July or early in August, and we know that just at this time the female caterpillars had but shortly transformed from black, distasteful-looking grubs into bags of eggs, certainly, from the epicurean point of view, more tempting morsels.

I have not been able to obtain any clue to the nature of this formidable enemy of the Bag-worm, whose economic importance can only be estimated in the pounds, shillings and pence value of our wattle plantations. There can be no doubt that it is the primary factor in the control of this pest, as the work of parasitic fungi and insect parasites is as nothing in comparison.

Further observations upon the Bag-worm lead me to make a suggestion to growers regarding its control, which I trust will be taken as seriously as it is put forward. That is the collecting of the bags during summer (January to March) from young plantations.

Repeated observations go to show that it takes three to four seasons for a Bag-worm infestation to culminate.

I have already shown how Bag-worms are carried to new plantations by most adventitious processes. But to recapitulate. The young Bag-worms hatch out in the spring and before constructing their bags lower themselves, in colonies, by silken strands until they reach a branch below that bearing their natural home. Upon this strand they climb up

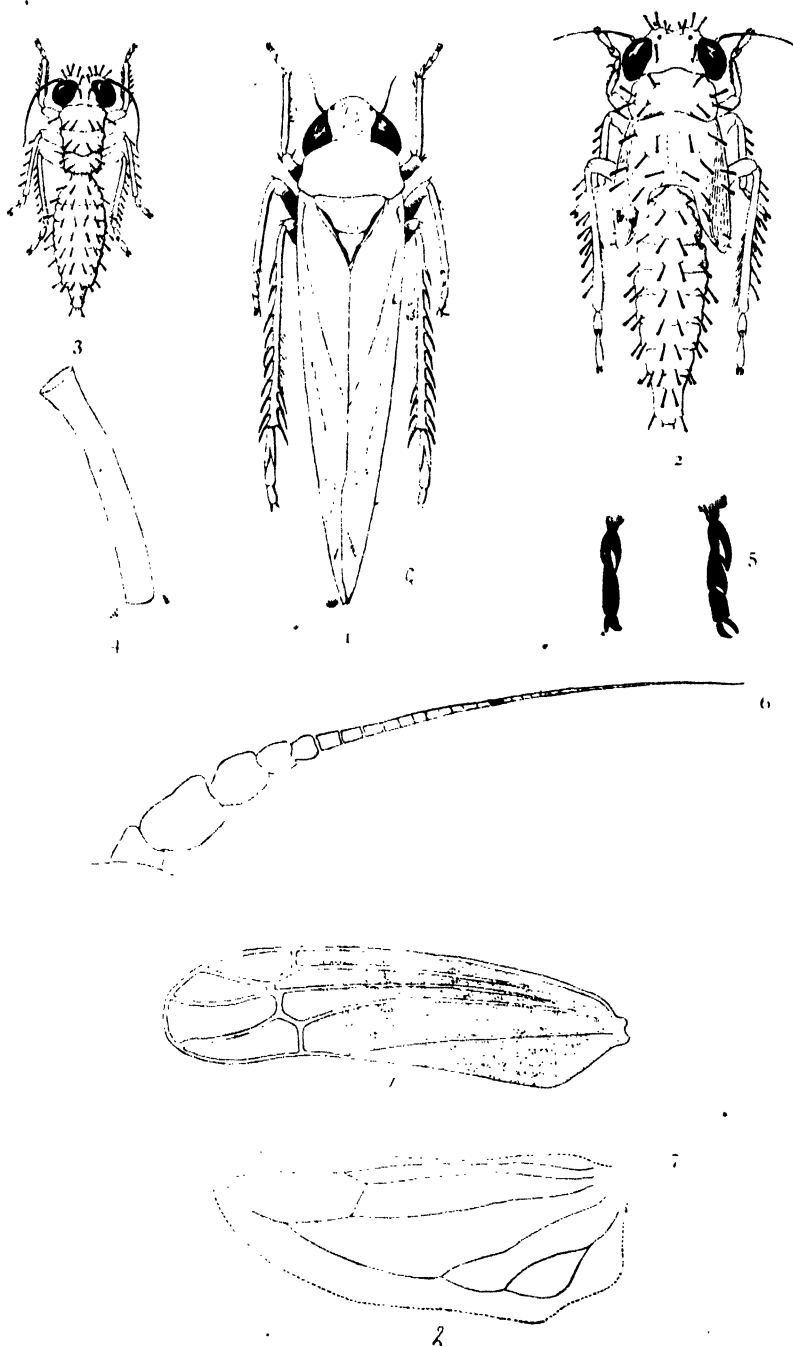
and down for two or three days, and then, taking to the foliage, construct their bags and start feeding. The peculiar habit thus displayed is undoubtedly Nature's provision for distributing the species; and, as with the ticks, it involves some passing agent to carry them to any distance. In other words birds and insects on the wing break through the silken strands and carry off the suspended caterpillars, each little caterpillar so starting out in life with but a remote chance of landing upon a suitable host plant.

How small these chances are is illustrated first by the great reproduction of the species, for when Nature leaves so much to chance she creates life in plentitude. The meagre limit of the chances is further illustrated by the limited number of Bag-worms found in a plantation when primarily infested even when fairly adjacent to infected plantations.

Primary infestation takes place during the first 18 months' growth, and as a rule it amounts to little more than one Bag-worm to every five trees. It is one of the simplest matters in the world to remove these bags because of the fewness of the bags, and this annual removal (recommended for February because the bags are then large and easily seen) could be carried out at little expense. When the trees are small they can be hand picked and later pulled off the trees with a recurved prong—like the claw of a hammer—mounted upon a whipstick. If only practised for the first two seasons of growth this treatment should, except under unusual circumstances, prove most beneficial to the trees.

BAG-WORM GIRDLES.

My attention has frequently been called to the form of injury illustrated in Figure 1, which shows two girdles caused by the tight attachment of the bag to a growing twig. This form of injury is purely mechanical and is often met with in young fruit trees when the wire of the label has not been loosened or removed. In these cases it is to be noticed that the twig is always more swollen above than below the girdle. This peculiarity is explained as follows:—The food supplies taken up from the soil by the roots are not directly useful for the formation of plant tissue. They must first be conveyed to the leaves which represent the stomach and breathing organs. Here the juice or crude sap is elaborated and this elaborated sap is transferred to every part of the plant—back again to the roots even—to enable growth to proceed. The elaborated sap travels in the inner layers of the bark, and that passing down the stem is intercepted at the girdle, and, being deposited there, an abnormal growth results.



ANGUS' LEAF-HOPPER, *Kybos* sp.

(All figures greatly enlarged. 1, 2 and 3 proportionately).

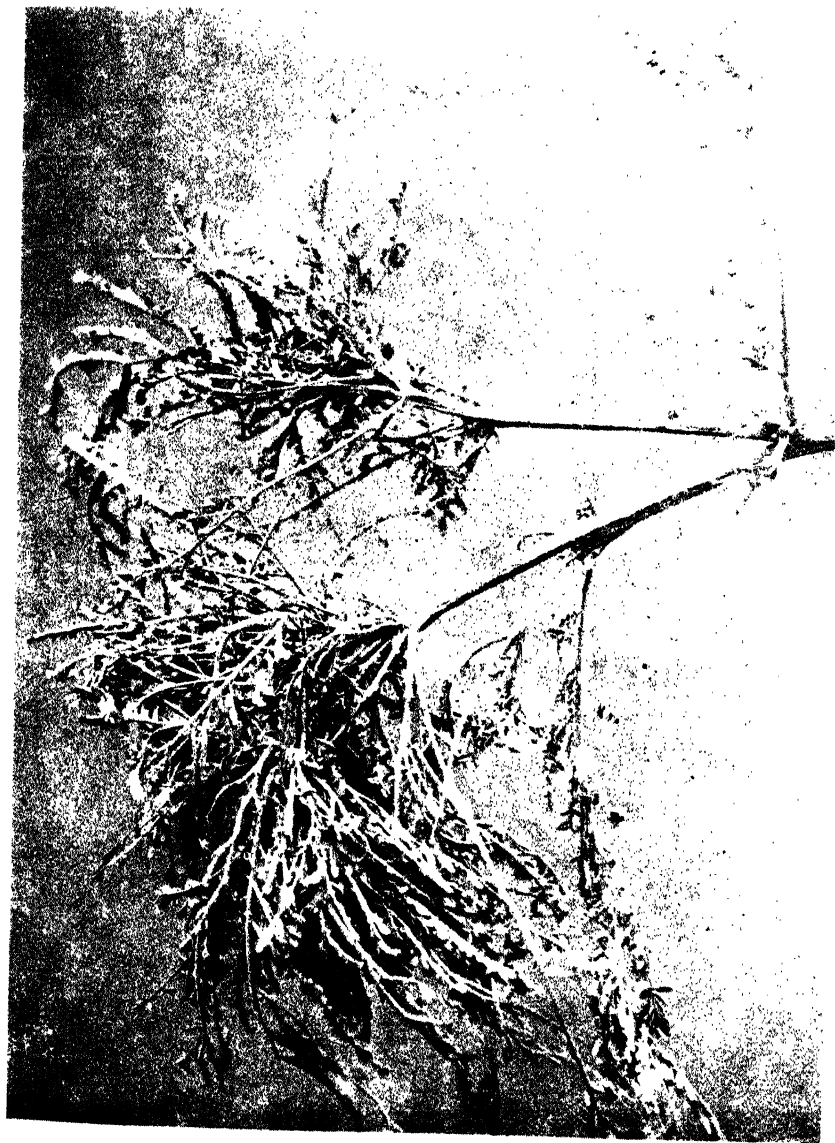
1. Adult Leaf-Hopper about 20 times natural length. 2. Full grown nymph.
3. Larva. 4. Tubular spine of larva and nymph. 5. Feet of larva and adult. 6. Antenna of larva. 7. Forewing and hindwing of adult.



THE WATTLE BAG-WORM.

TORN BAGS. 2. Torn upwards. 3. Side torn down. 4 and 5. Torn down from Neck. 6. Ripped in halves.

(See Article on "Some Wattle Insects," by Mr. Claude Fuller.)



"FROG-HOPPER" TROUBLE.
Wattle twig showing immediate effect of "Frog-Hopper."
(See Article on "Some Wattle Insects," by Mr. Claude Fuller.)



"FROG-HOPPER" TROUBLE.

Wattle branch showing knots following upon "Frog-Hopper" Trouble.

(See Article on "Some Wattle Insects," by Mr. Claude Fuller).



"FROG-HOPPER" TROUBLE.

Wattle stem showing branching following upon "Frog-Hopper" Trouble.

(See Article on "Some Wattle Insects" by Mr. Claude Fuller).



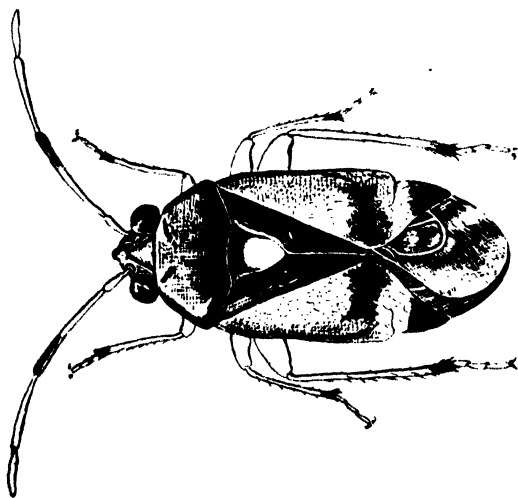
The Larger Wattle Chafer (*Hippopholis somneri*, Burn), Enlarged.



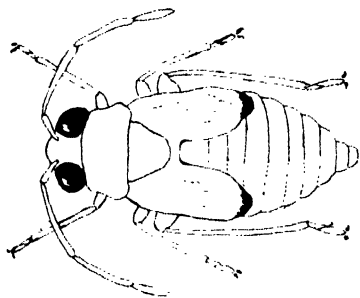
The Smaller Wattle Chafer (*Monochelus calcaratus*, Burn).

THE LARGER AND SMALLER WATTLE CHAFERS.

(See Article on "Some Wattle Insects," by Mr. Claude Fuller).



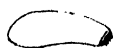
1



2



3



4

THE WATTLE CAPSID

Illustrating the development of Campbell's Wattle Capsid.

All figures proportionately enlarged, and shown about 10 times natural length.

1. Adult. 2. Full-grown nymph. 3. Newly hatched larva. 4. Egg.



THE FROGHOPPER TROUBLE.

PRELIMINARY ACCOUNT.

The extensive wattle plantations at Hillcrest have more or less recently suffered severely from a trouble which is generally alluded to as "frog hopper." Later enquiries go to show that the disease is becoming very general and of urgent importance even in the older wattle-growing districts.

The Hillcrest and Coastal plantations are, of course, of recent origin, and it could only be expected that in the natural order of things the extension of the wattle belt down to the Coast should result in some new phases both as regards growth and troubles due to insects, fungi, and physiological disturbances. The "frog hopper trouble" appears to be of more serious import to these plantations than it will ever be to the higher plantations of the Umvoti; at the same time it is worthy of notice that since the trouble became so preponderant upon the Coast it has increased in force higher up country.

The symptoms are defoliation, stoppage of growth—sometimes for six months—and forking (which may be moderate or excessive). The result under the most favourable circumstances is a bent or crooked trunk, otherwise the disease may be so aggravated that the result is a stunted, ill-shapen plant, covered with woody knots or thick bunches of aborted foliage resembling so many "witches'-brooms." So remarkable is this that at first one is almost compelled to believe that the trees are suffering from the attack of one of those fungi which is followed by the formation of brooms of distorted foliage.

The term "frog hopper" has been given to the trouble under a misapprehension, and it is neither elegant, descriptive, nor, I fear, applicable: it is, however, concise and generally accepted.

Although long known and written off as something to be endured rather than cured in parts of Umvoti County, attention was seriously called to it by Mr C. D. Keith-Frazer as recently as September last. He had experienced the trouble earlier of course, but following the lead given him by others regarded it as only a passing disturbance from which the trees would shortly recover. It became so aggravated, however, that the Minister of Agriculture was approached with a view to its investigation.

I accordingly visited the Hillcrest plantations on the 21st of September, and whilst there was ample evidence of the extent and seriousness of the trouble no trace of any mischief-maker was found, and although informed that the plantations had been infested the previous summer with small frog hopper-like insects, I must confess to an inclination to put the disease down to a parasitic fungus.

About the middle of October the Hon. Marshall Campbell reported froghoppers abundant in his plantations and forwarded specimens of a small capsid bug as the destructive agent. These plantations were inspected towards the end of the month and the suffering plants were found invaded by these small bugs in all stages of growth, but not in sufficient numbers to at once account for the damage. No frog-hoppers nor leaf-hoppers were observed. The opportunity was taken to examine the native mimosas growing in the veld hard by. All of these were at once seen to have been suffering for years back from an affliction similar to that of the wattles, and a few bugs of the same species as upon the wattles were taken, but here they were not even in so much evidence as upon the latter plants.

More recently an examination was made at Crammond. Here were present the small sapsid buds originally found at Mount Edgecombe and a very small leaf-hopper. Mr. Angus was well acquainted with the latter insect and regarded it as the cause of the trouble. After a good deal of observation, however, we arrived at the conclusion that the capsid was in more potential abundance. More recent collections from affected plants all show the two insects in company, and, whilst feeling convinced that the bug is the chief enemy. I am not yet able to define the status of the leaf-hopper.

One feature of the trouble to which my attention was drawn is said to be the denudation of the leaflets, which fall off, leaving naked leaf stems. In such cases there is no distortion, and I am at present inclined to attribute this feature to the attack of the leaf-hoppers. It is equally certain that the bugs cause a similar effect, but it is arrived at by the pricking of the leaflets just as they are expanding and whilst still thick and pulpy. In this case the leaflets wilt and die without expanding and the stalks continue to grow, whereas in the other case it seems the leaflets fall after expanding.

There is no doubt that the bugs kill the terminal buds which die and shrivel after the juices have been sucked from them. This stimulates the formation of adventitious buds, which appear in great numbers. The same thing occurs with axillary buds. It appears to me that a persistent and general attack of all growing points results in the cultailment of upright growth, and it follows that a comparatively small colony of insects can produce the trouble, especially when it is remembered that the individual bug's life probably extends over two months.

The general characteristics of froghopper trouble are illustrated in the several full page illustrations which accompany these notes, and the subjoined figures are sketched from a portion of the distorted foliage shown in one of the plates.



FROG-HOPPER TROUBLE.

1. Terminal shoot crowned with swollen and adventitious growths. In order to show the numerous young growths, no less than 16 others have been removed before making the sketch. 2. Section through a bunch of adventitious growths produced in the axil of a leaf with the stem. 3. Half of an arrested terminal from which a great number of growths have been removed or cut back and showing a bed of adventitious buds. (Note. -Bug's eggs were found inserted amongst the buds). 4 and 5. Distorted growths removed from No. 3.

REMEDIAL MEASURES.

Once it is realised that the trouble is brought about by the continuous attack of a relatively small number of insects, which while increasing numerically as the summer advances do not do so at any alarming rate, it is obvious that any treatment which will destroy the creatures when an attack begins will prove beneficial.

This then leaves two questions to be considered: They are, first, what to use, and, secondly, is such treatment profitable? So far as the latter question is concerned it will have to remain open until by experiment it is proved to be an economic proposal or not.

It has been ascertained that bugs and frog-hoppers both succumb readily to the contact of paraffin oil, and I have little hesitation in saying that spraying with a mechanical mixture of water and paraffin is for the present the most promising method of destroying these insects.

It is quite true that the adult bugs and frog-hoppers are very active and leave the plants when disturbed, and that by jarring the trees large numbers can be collected and destroyed by sticky screens, but it has been noticed that, even after shaking branches quite vigorously whilst the adult bugs and young and old frog-hoppers are removed many young bugs remain secreted in the tips. For this reason I expect better results from spraying, for not only will the spray destroy the miniature bugs and frog-hoppers, but the adults as they take flight will be involved in the cloud of spray and destroyed.

DESCRIPTIVE.

The bug and the leaf-hopper under discussion are representative to the two great divisions into which the order of Bugs, *Hemiptera*, is divided.

The chief characteristics of the order are that its members are all **suctorial** and are active throughout their development, the young and nymphs, like grasshoppers, locusts and ticks, bearing a strong resemblance to their parents. In other words they never pass through the almost violent changes of external appearance seen in the development of grub to beetle, maggot to fly or caterpillar to moth, nor does any inactive chrysalis or pupa stage occur.

The order itself is divided into two great sections. To the first belong all true bugs. True bugs have their sucking beaks placed in front at the apex of the head and their wing-covers lie flat and overlapping upon the back of the body, the tips being as a rule membranous whilst the remaining portion is leathery. The second section is characterised by the beak being placed underneath the body and projecting backwards from the posterior part of the head, and further by the wings being of the same nature throughout, usually glassy, and carried at a sloping attitude (pentwise) over the back.

The first section of true bugs are very characteristically uniform in appearance and because of this are readily recognised as such. In the second section we find Cicadas (singers), spittle-bugs, frog-hoppers and leaf-hoppers as typical representatives, and aphides and scale-insects as aberrant forms.

The typical forms deposit eggs, and these are usually laid in clusters. Frog-hoppers and leaf-hoppers' eggs are inserted in the tissue of the host plant, the females being provided with ovipositors adapted to this function. Bugs, upon the other hand, generally lay their eggs

upon exposed surfaces, with the exception of those belonging to the large family Capsidae, to which these destroying the wattles belong.

So far the eggs of our leaf hopper have not been observed, and it may yet be found that they are laid in the haulms of grass growing in the plantations. Very little has been seen of the bug's eggs; such as have been found have been taken singly and inserted in crevices amongst the buds. If, as is assumed from these observations and the varying stages of development in which bugs are found upon infested plants, this bug lays its eggs singly, then the egg-laying period is a protracted one during the summer, and helps to explain the continuousness of the attack.

The Capsid bugs are about one-fifth of an inch long with somewhat tortoiseshell markings with a conspicuous white spot upon the triangular shield lying between the bases of the wings. The nymphs are clear green except for two dark areas at the tip of each wing sheath. Just before entering the nymph stage the young are quite green, but earlier they are a pale buff colour. The young stages of this bug somewhat resemble aphides.

The leaf-hoppers are minute and narrow and of a lemon yellow colour in all stages. When seen upon the foliage they resemble small yellow lines about one-tenth of an inch long. The nymphs and larvæ are clothed with peculiar tubular processes or spines found upon the legs as well as the head and various parts of the body.

Both bugs and leaf-hoppers display the habit of dodging around to the other side of the stem or leaf they are upon when approached.

WATTLE CHAFERS.

Among several other beetles both the greater and the lesser wattle chafers have been the cause of much complaint during last summer, in some districts the one proving the more injurious and in others the other. The eggs of both beetles are laid in the soil and the young or grubs are known as cock-chafers or white grubs, finding nourishment upon the roots of trees, shrubs and grasses. It has been ascertained that there is only one generation a year. The eggs are laid, upon the whole, during February, and the grubs attain maturity and pupate the following spring, emerging as beetles during December. Originally inhabitants of the veld, both now breed abundantly in the plantations, the grubs feeding upon the wattle roots.

The greater damage has been done during the past season by the lesser Wattle Chafer (*Monochelus calcaratus*), and the invasion of new plantations by these insects from the veld was observed.

The beetles put in their appearance at various points upon the margins of plantations, invading a few trees like swarms of bees and

completely defoliating them. As the first trees were defoliated the creatures spread in colonies to those immediately adjoining. The trees in the rows being in closer proximity than the rows themselves, the inroads of the swarms took the form of a triangular wedge, the apex being driven into the plantation.

These beetles when disturbed drop instantly towards the ground, the majority falling all the way; but, should the day be at all warm, they take to flight before the fall is completed. It was further observed that a great social instinct prevailed during the period of feeding, and that, when disturbed, the insects congregated together again. If left alone these invading swarms keep on defoliating the trees adjacent to the invaded spot, and after being fully fed and copulating they spread over the plantation laying their eggs.

When such primary invasions are noticed in young plantations, an effort should always be made to collect and destroy the beetles, and this is not a difficult matter if the work be done at dawn, whilst the insects are inactive. Of course, a good many beetles will escape, but they will clump together again and the work can be fairly thoroughly manipulated. One gentleman tells me that he had much success by making a huge purse with the aid of semicircular pieces of iron hinged together. In the purse was a pocket into which the beetles were gathered together after the mouth was closed. By this means he was enabled to eliminate several swarms very satisfactorily.

Mr. J. H. Dalgarno has been appointed to act as Assistant Stock Inspector for the Ixopo Division, with effect from the 1st April.

During the last year the Queensland Government, we learn from an exchange, paid out in bounties to white cane-growers in that State something like half a million sterling.

TO GET RID OF RED ANTS.—The Editor of the *Queensland Agricultural Journal* replies as follows to a correspondent who asks to be informed as to the best method of getting rid of red ants:—Try the following remedy: Mix flour, sugar, and arsenic to the consistency of putty with water, and place pieces of the mixture about the nests of the ants. If an examination is made a few days after using this remedy, hundreds of dead ants will be found in the vicinity of the poison, and it is very unlikely that the ants will reappear on a spot where the mixture has been used.

Treatment of Muck Soils.

SOME USEFUL HINTS.

MUCK soils are to be found here and there scattered over different parts in Natal. When properly drained and handled they are in many cases extremely productive. The amount of muck land reclaimed by drainage and brought under cultivation is rapidly increasing, and it is becoming a matter of considerable importance to know the best methods of utilising these lands. Extensive areas of muck soils are found in the United States, and in Bulletin No. 93 of the Florida Experiment Station, Mr. A. W. Blair summarises the results of his study of these soils and makes suggestions regarding their treatment which are of general interest. He states that "muck soils are formed by the decay, in low, wet places, of grasses, weeds, twigs, leaves, and even trees. Being so largely formed from vegetable matter, they are much richer in nitrogen than ordinary soils. They usually also contain small amounts of phosphates and potassium."

It is recognised, of course, that proper drainage is a necessary prerequisite to the use of muck soils, for "if muck soils are to be cultivated it is obvious that they must first be drained. This is necessary in order that they may become the home of the various kinds of micro-organisms that play an important part in the making of a fertile soil. These micro-organisms need moisture, but they cannot develop in mud or standing water."

The method of cultivation requires particular attention. Cultivation should be deep, especially at first, in order that the air may thoroughly penetrate the soil. Muck soils often contain substances that are injurious and even poisonous to plants. When these poisonous substances are exposed to the air they are probably oxidised to a considerable extent and thus destroyed. A free circulation of the air also improves the conditions for the development of the useful micro-organisms.

Muck soils are, as a general rule, acid or sour, and this acidity must be corrected before they will be productive.

Suitable materials for this purpose are finely ground limestone, air-slaked lime, wood ashes, and marl. Finely ground limestone (the native rock) is to be preferred to the forms commonly used, since it is effective, is more easily handled, and harm is not likely to result from the use of amounts in excess of what is needed to neutralise the acids.

It will be necessary in most places to use larger quantities (of neutralising material) on muck soils than on upland soils. If limestone and a half or two tons may be used. The material should be thoroughly is used, 2 to 6 tons per acre should be applied. If lime is taken, a ton

worked into the soil one or two months before the crop is planted. This will give time for the lime to neutralise the acid.

The importance of destroying acids can be better appreciated when we remember that the micro-organisms that convert organic nitrogen into a form that can be used by plants cannot develop in a highly acid soil. The limestone and lime also furnish a suitable base with which the nitric acid that is formed may unite, thus producing calcium nitrate which can be taken up by plants.

If muck is to be used for fertilising purposes on upland soils, it is also necessary for the acids to be destroyed. This can be done either by composting it with one of the materials already mentioned, or by applying the latter when the muck is applied, or afterwards, and thoroughly mixing both with the soil by cultivation. Muck may be improved by simply drying and thoroughly airing it. This is especially true of mucks that contain iron compounds. We cannot expect a satisfactory yield of such crops as celery and lettuce on muck land until the acids have been largely destroyed.

It occasionally happens that a muck deposit is underlaid with marl, or is in close proximity to a limestone formation. In such cases it is not so likely to be acid, and might not require the treatment with lime.

Muck soils, being especially rich in nitrogen, should, one would think, require but little, if any, of the nitrogenous fertilisers. Experience has, however, shown that in many cases they do require additional nitrogen. This is because they are so strongly impregnated with acids that the bacteria which would otherwise convert the inert nitrogen of the organic matter into soluble nitrates cannot live. When this unfavourable condition has been corrected, less nitrogen in the form of commercial fertiliser will be required. If a quick-growing vegetable crop is being produced, nitrate of soda may be used to good advantage, as may also stable manures, since it introduces beneficial bacteria; but sulphate of ammonia and organic forms of nitrogen (such as cotton-seed meal and castor pomace) should not be used; the former because it will aggravate the acid condition, and the latter because there is already enough organic nitrogen present. Phosphoric acid and potash may be used liberally if desired. For phosphoric acid ground bone is an excellent material; while a ton or two of finely ground phosphate rock would also be of assistance; not so much, however, for immediate results as for future crops, since the acids in the muck will very gradually convert the insoluble phosphoric acid into the available form. For potash, any of the potash salts will suit. Kainit has been used on the muck soils of the State of Illinois with good results. Hardwood ashes are an excellent source of potash, if they can be produced on the place or bought at a reasonable price.

Management of Creameries.

NEW ZEALAND REGULATIONS.

THE following working arrangements have been arrived at between employers and employees with regard to the hours of work and pay in New Zealand creameries, over which there had previously been a dispute.

HOURS OF WORK.

1. (a) The hours of work in butter and cheese factories shall not exceed 70 hours per week of seven days, exclusive of meal hours. (b) The hours of work in creameries shall be arranged between the employers and the respective workers.

OVERTIME.

2. Any time worked in excess of the hours herein prescribed shall be paid for at the rates of time and a quarter for the first four hours and thereafter at the rate of time and a half.

WAGES IN BUTTER AND CHEESE FACTORIES.

3. The following shall be the minimum rates of wages for workers employed in butter and cheese factories:—(a) Where only one adult worker other than the manager is employed, he shall be paid not less than £2 per week. (b) Where two adult workers other than the manager are employed the first assistant shall be paid £2 5s. per week, second assistant £2 per week. (c) Where three or more adult workers other than the manager are employed:—In other than branch cheese factories: First assistant £2 15s. per week, second assistant £2 7s. 6d. per week, third assistant £2 per week. In branch cheese factories: First assistant £2 10s. per week, second assistant £2 5s. per week, third assistant £2 per week. (d) Other hands not including youths, £1 17s. 6d. per week. (e) Engine driver, where certificate is required, £3 per week. (f) In addition to the wages herein prescribed as above, milk, firewood and free sleeping accommodation shall be provided; and in the case of workers in butter factories, single men shall be supplied each with 1 lb. of butter per week, and married men with 2 lb. each per week.

CREAMERY MANAGERS.

4. The wages of creamery managers shall be not less than £2 5s. per week with firewood, milk, suitable living accommodation and butter as above. Any creamery whose daily average supply during December does not exceed 1,000 gallons shall be exempt from this award.

GENERAL.

5. Where any of the above-mentioned extras are not supplied, payment

shall be made in lieu thereof, the amount to be settled by agreement between the employer and the worker, and failing such an agreement then by the local Inspector of Factories.

EMPLOYMENT OF YOUTHS.

6. Youths over the age of 16 years may be employed in factories at not less than the following wages:—From 16 to 18 years of age, £1 per week; from 18 to 20 years of age, £1 10s. per week.

HOLIDAYS.

7. (a) Every worker who shall have worked for not less than eight months during the same year for the same employer shall be entitled to and shall receive 14 days' holiday on full pay, and a holiday of proportionate duration shall be allowed every worker who shall have worked less than eight months during the same year for the same employer, but not less than two months. For the purposes of this clause the year shall be reckoned in each case from the date of the commencement of the contract of service. (b) It shall, however, be optional with employers to give workers in cheese factories one day per week instead of the holiday prescribed in Clause 7 (a), the aggregate of such days not to be less than the worker would receive under Clause 7 (a).

The recommendations further provide for a bathroom at butter and cheese factories where two or more workers are employed; piecework not to be allowed; employers to be entitled to have all or part of their work done by contract, but the contractor to be bound to pay any worker employed by him the minimum rate of wages prescribed by this award, and observe all the other conditions applicable to such workers; wages to be paid monthly; 14 days' notice of termination of engagement to be given on either side; no employer to discriminate against members of the Union; the term of the award to be two years.

Feeding is useless without breeding. Unless an animal is adapted by breeding for making of beef it is folly to try to make it put on an abundance of flesh through any system of feeding that may be devised.

The general care of a horse should be looked after more than it is. The feeding and watering should be by system, regulated by the clock. The morning's feed should be one-fourth of the day's feed; the noon's feed the same, and at night the other half should be given the best way under the circumstances. With food well balanced and good general management a horse can do one-third more work in a season than the slipshod way of feeding.

The Orchard.

By CLAUDE FULLER.

CITRUS EXPORT.

DESPITE the ill success attending the citrus export of 1909, many should continue to export to London this winter. At any rate arrangements are in progress for shipping two to three hundred thousand oranges from the Midlands, and there is no reason why large quantities of naartjes should not go forward early in the season.

The experiences of the past three seasons have been varied, but nevertheless a great deal has been learned which cannot fail to be of lasting benefit. There can be no doubt that in the development of a citrus export industry we must hasten slowly and build up gradually, looking to the future for the possibility of accomplishing big things rather than to the immediate present. There is much still to be learned, much more still to be done, before export in a large way can be upon an assured basis.

The most promising outlook is in the export of Midlands oranges—there can be no hesitation in saying that their export should be continued and increased, most especially that of the Washington Navel. The Midlands oranges carry well, and, taken all round, return profitable prices—the better the quality the better the return.

Although of excellent flavour, Coast oranges are far too delicate to justify the risk of shipment upon any large scale, and only individual experimental shipments should be continued. In this case, however, it will be safer to send the fruit by cool chamber rather than by hold, despite the fact that the freight is more than double.

The export of naartjes upon a moderate scale and early in the season is bound to continue profitable. The early fruit fetches better prices and carries better. Later fruit not only carries less well but arrives in competition with the summer fruits of Europe.

As matters stand at present with out most convenient market—London—a large export trade in naartjes cannot be contemplated, for that market is not yet prepared to absorb more than two 3,000 trays per week. Oranges are much more popular there than mandarines, and so long as the former can be retailed for a less figure so long will the general consumption of the latter be curtailed.

Hitherto we have forwarded our naartjes as “Naartjes,” but it is very questionable whether the term will ever be taken up; it is not euphonious to unaccustomed ears nor agreeable to unaccustomed tongues.

Exporters, for all practical purposes, would be well advised to ship their naartjes as mandarines, coining some other word such as "Organette" for the variety here grown as the mandarine.

Sound, carefully handled, cured and well-packed fruit can be sent to arrive sound, and growers who will take it upon themselves to do all things wisely and well cannot fail to get their fruit Home sound.

To the grower picking and packing the fruit himself there should be only one difficulty in putting up perfectly sound fruit. That is the elimination of fly-stung and caterpillar-infested fruits.

Those who have already sprayed their trees with Mally's fly poison know that they have nothing to fear upon account of the fly, and when they recount their experiences and their satisfaction there will be few growers who will not adopt this treatment next year.

In the case of the grub the position is more difficult. Invaded oranges can often be detected, but with mandarines and naartjes it is generally impossible to tell that there is a grub inside, although the creature may be an inch in length. In picking, the grub-infested fruits will frequently come away readily in the hand, and this is a point upon which pickers might be impressed so that these fruits may be rejected. The fact that the orange grub invades acorns, the brood emerging just in time to attack the ripening citrus crop, rather complicates the treatment of the pest in some orchards, and growers may yet have to spray thoroughly with arsenate of lead during March and the first weeks of April, perhaps even later.

The treatment originally recommended is gathering all fallen fruits, and this must be continued. The frequent and rapid removal of fallen fruits and their efficient destruction is imperative in this Colony and must be done "without thinking." In other words, it must be undertaken not as a trouble, but in the same spirit that one performs such daily necessities as the morning ablutions. Not only must the fallen fruit be gathered on account of the maggots and caterpillars it contains, and not only because it has a breeding ground for millions of blue-mould spores, but also because it infects the soil with the newly discovered Black Rot, which recent investigations have shown to be so pestilential.

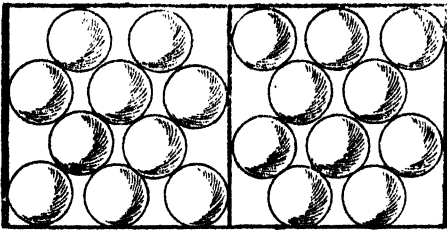
For general information regard the picking and handling of the citrus crop the notes given for April, 1909 (*Agricultural Journal*, pp. 340—345), should be re-read.

Use good picking bags, have ladders and a plentiful supply of strong field boxes.

Remove the fruit with blunt nosed orange clippers—cutting the stalk off short against the calyx lobes.

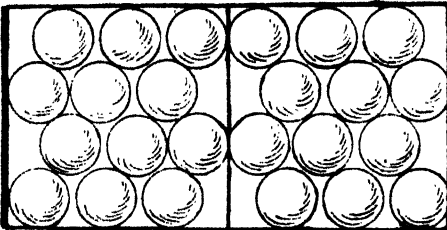
Remember that the slightest bruise or scratch will allow of the entrance of blue mould and black rot. See that the pickers' finger nails

Standard Orange Packs.



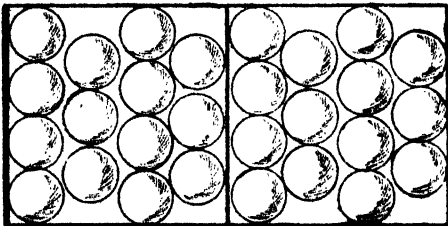
STANDARD 80-PACK

FOUR LAYERS.



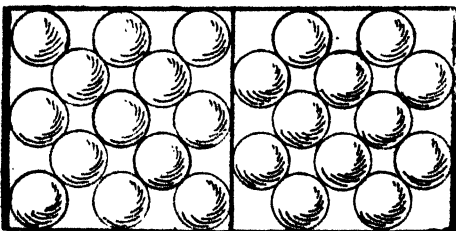
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FOUR LAYERS



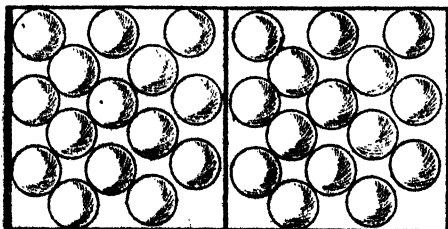
STANDARD 112-PACK.

FOUR LAYERS



STANDARD 126-PACK.

FIVE LAYERS



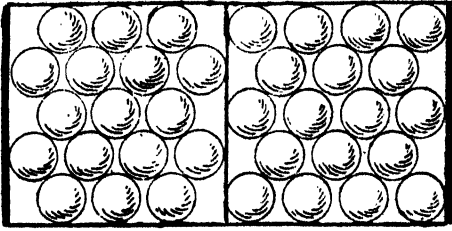
STANDARD 150-PACK

FIVE LAYERS.

Note that in the diagrams of the 80, 96 and 126 packs the right half shows the arrangement which the second layer of fruits will fall into. The wide spacing of the 80, 126 and 150 packs should be particularly noticed.

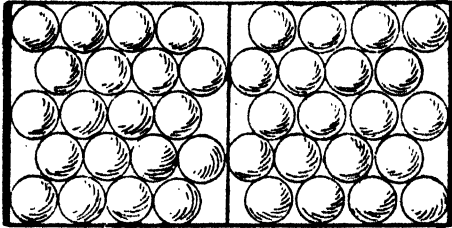
96 pack oranges are $3\frac{1}{2}$ inches in diameter ; 112 are $3\frac{1}{4}$ inches ; 126 are $3\frac{1}{8}$ inches ; 150 are $3\frac{1}{10}$ inches.

Standard Orange Packs.



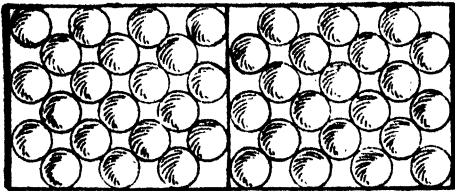
STANDARD 176-PACK

FIVE LAYERS.



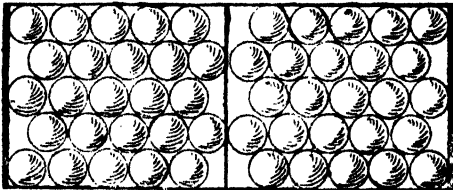
STANDARD 200 PACK.

FIVE LAYERS.



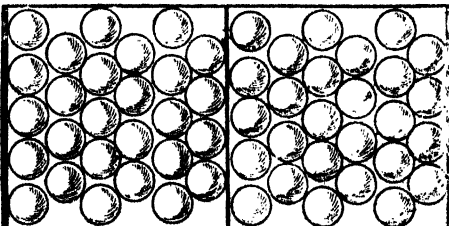
STANDARD 216-PACK.

SIX LAYERS.



STANDARD 250 PACK

SIX LAYERS.



STANDARD 324-PACK.

SIX LAYERS.

Note that in the diagrams of the 176, 200, 216 and 250 packs the right half shows the arrangement which the second layer of fruits will fall into. Attention is particularly called to the wide spacing of the 216 pack.

The 176 pack is of oranges 2-15/16ths inches in diameter ; the 200 of 2-13/16ths inches ; 216 of 2-11/16ths inches ; the 250 of 2-1/3rd inches.

are trimmed short. Never allow the fruit to drop, and handle it as you would handle eggs.

Allow the fruit to cure for four to six days before packing.

Never place the fruit upon the ground nor amongst grass or allow it to come in contact with any organic debris.

Never pack blemished fruit.

WRAPPERS.

The sizes of wrappers required for oranges are as follows:—

Diameter of feet. Inches.	Size of paper. Inches
3½	12½ x 12½
3¼	12 x 12
3	12 x 10
2¾	10 x 10
2½	10 x 8
2¼	10 x 8
2	8 x 8

PACKING CITRUS FRUITS.

Nothing is more essential to success than proper packing. Anyone can learn to pack properly and everyone should.

The primary feature of a well-packed package is that the fruit does not shift or rattle after the lid has been fixed down.

All buyers insist upon the fruit in a box being of an even size; apart from this fruit cannot be packed firmly, tightly nor uniformly unless it is evenly sized.

The first preliminary to packing is therefore sizing.

Sizing is sometimes spoken of as grading, but the term is misapplied; the grade of a fruit is influenced, of course, by the size, but the term grading applies to sorting out in accordance with quality, colour, and appearance. Thus, given two equally good, bright, clean oranges, one 2½ inches in diameter and the other 3 inches, then the latter might be considered a higher grade fruit. On the other hand, given two three inch oranges, one bright and well coloured, the other dingy, partly coloured or marked with insects or blight, the one is a good grade, the other a bad, no matter how nearly the eating qualities of the two may approximate one another.

Oranges, because of their shape, can be sized by machinery, naartjes cannot.

Sizing can with practice be done by the eye, but even in this case it is desirable to have some means of correcting any error. For this purpose a series of rings should be obtained with at most a difference of an eighth of an inch in diameter. For good and uniform packing it will be

found that the fruit must be sized off to eighths of the inch, not by half inches as frequently practised.

For export naartjes are best packed in single layers, or at most two layers. Two-layer boxes should contain approximately 80 fruits. For single layers small trays are preferable to large; that is, trays about 12 x 12 are better than 12 x 18. The market prefers that all trays should contain the same number of fruits, say 20. This means a series of trays of varying sizes. This principle prevails in the case of mandarine export from Spain, and is recommended for gradual adoption by Natal exporters of naartjes.

For export, the California orange box, which measures practically 1 x 1 x 2 feet is received as a standard package. So far, however, the half strap, measuring 2 feet in length, 1 foot in breadth, and 6 inches in depth, has been found the more suitable and remunerative in the case of Natal oranges.

Naartjes should always be packed flat and never on their sides, and with oranges the stem should be point downwards, except the bottom layer, which should have the stem pointing upwards so that if the bottom is removed when opening the "pack" is properly "faced."

The only way to secure a full pack, to eliminate the use of wood wool and prevent rattling, is to arrange the fruit in alternating rows. The diagrams which accompany these notes show the various arrangements of the standard California packs, each square being approximately $11\frac{1}{2} \times 11\frac{1}{2}$, inside measurements.

In packing upon this system it will be noticed that whilst the second layer takes on the same arrangement as the first, the fruits of the second layer, being placed between the fruits of the first, or rather in the hollows, take also an alternative arrangement.

In some of the arrangements one layer will have one fruit more than another. In the diagrams given herewith, where this occurs the position of the second layer in comparison to the first is shown in the right hand compartment of the drawing.

Where boxes with differing floor areas are used some experiment and a modicum of ingenuity will soon discover the correct arrangement to secure a full pack. In this connection one has not only to consider the length and breadth of the bottom of the package, but also the depth. Thus it will often be found in packing boxes of two or more layers that whilst by a certain arrangement a very nice original layer can be readily alighted upon, when the final tier is put in it is either too high or too low. By a rearrangement of the first layer, that is by using fewer fruits and making spaces between them, the fruit of the second layer falling lower into the interstices firms the first layer, keeping the fruits in position, and when the box is full the upper layer much more readily ap-

proximates in height the sides of the box than it did by the original arrangement.

Wood wool as a medium for making a full pack should be discarded. In packing oranges, if the top layer is not more than a quarter of an inch above the sides so much the better, for the pressure of the lid will not affect the fruit. Wood wool can only be legitimately used when only a thin layer suffices, but every effort should be made to avoid its use altogether.

Of course each fruit must be wrapped separately in paper.

BUNDLING.

Trays of naartjes should be bundled in fives. Boxes should only be bundled to make a package of approximately 2 cubic feet. Thus, orange boxes of the California standard packages are not bundled. Half straps may be bundled in twos. Separate boxes should be bound. For binding and bundling light hoop iron strapping has been used in the past, but this is not at all in favour upon the English market. Orange boxes should be bound with split willow, but these canes are not yet procurable. A supply is, however, anticipated for 1911. Other alternatives are plaited grass rope and cow-hide thongs.

MARKING AND ADDRESSING.

Every box of fruit should be marked upon both ends, showing the nature, grade, and number of contents, together with the exporter's name or brand. Those who intend becoming regular exporters should, if favouring imported boxwood, have the ends printed. Otherwise neatly printed labels should be obtained, sufficiently large to cover the ends, and pasted on to the boxes.

In addressing it is usual to have some distinctive combination of letters. Thus, if the fruit is being forwarded to G. Smith, London, G.S. over L. in a diamond is a good combination, and a stencil plate should be obtained for stencilling this mark upon the side and top of each package.

so :

also



A stencil plate with the word London in bold letters should be obtained, and each package should be stencilled on top.

GENERAL ORCHARD NOTES.

The fall working of orchard lands should not be longer delayed. If the soil is well cultivated and stirred it will retain its moisture throughout the winter and be all the more easily worked in the spring.

Vlei rats are getting very troublesome in many up-country orchards, and are as a rule driven into the orchards through the burning of the veldt and encouraged to remain by the grass growing therein. These creatures not only make a warren of the orchard but also destroy young trees, ringbarking them near to the ground.

It is not a bad plan to tie some sacking about trees likely to be attacked. The soil should be removed for a couple of inches and a band of 8—10 inches wide of mealie sacking tied around the base, and the soil replaced. These rats do not attack the roots nor do they climb the plants.

The best treatment for trees barked by these pests is a poultice of fresh cow-dung; the sooner it is applied the better its effect.

Any slow acting manures, such as kraal manure and compost, may be applied to the orchard now if desirable. If liming is contemplated, do not mix the lime with fertilisers. Of course rapidly acting fertilisers should not be applied now.

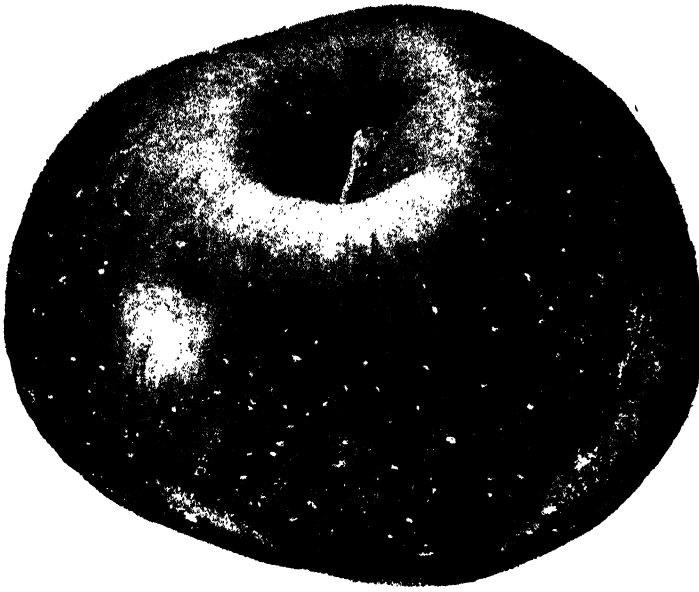
It will be too early to prune grapes and peaches are best left as late as possible.

Where the leaves are all down pruning of pears, plums and apricots, and cherries may be taken in hand. Remember that heavy pruning induces wood growth and is only necessary for young trees being brought into shape. Trees that have come into bearing only require light pruning. Be careful to burn all prunings as they harbour the seeds of fungus diseases.

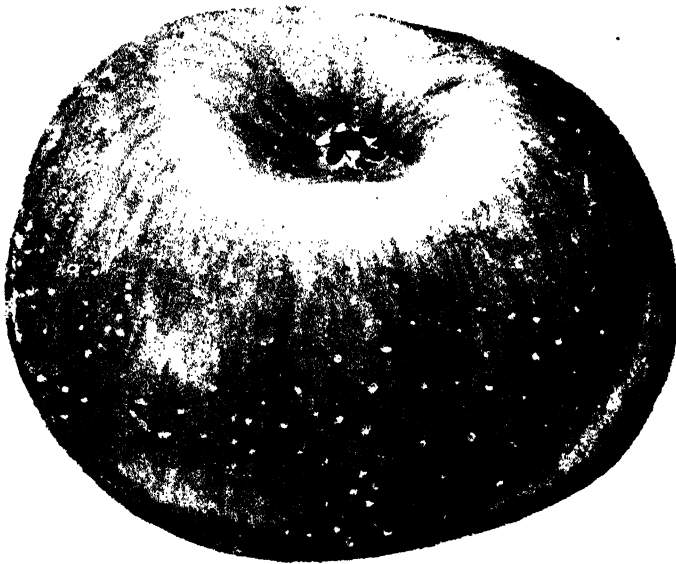
Arrangements should be made to give all deciduous trees a good winter spraying with Bordeaux mixture. I do not know any deciduous fruit tree that does not require winter spraying in Natal. Pears must be sprayed to control leaf-spot, peaches to control curl and black spot, apricots and plums for black spot and shothole fungus, and apples for fusieladium and ripe rot. The spores or seeds of all these troubles are carried through the winter on the bark, and their control by spring sprayings is out of the question unless these have been preceded by thorough winter work.

Where pineapples are subject to frost they should be protected by covering with dry grass or hay. Princes under clean culture are less liable to frost bite than weedy plantations.

As the main crop of lemons will shortly be coming, and by lemons I am not referring to the worthless, rough lemon, but the smooth-skinned varieties, a word or two upon curing will not be out of place. It has frequently been the writer's privilege to judge fruits exhibited at our horticultural and agricultural shows, and almost without exception the representation of this lemon class are always shown as great-sized, thick-skinned, coarse, small-pulped examples, and of no value except for the peel. When I have urged the need of picking these fruits whilst comparatively small in size and green in colour, I have been told that such is contrary to Nature. But Nature does not always turn out her goods to perfection—one would hardly compare a crab-apple to our old "American Lady" even, and so this plea holds for very little. Smooth-



(a) Top View.



(b) Bottom View.

THE HORN APPLE.

Showing Top and Bottom Views.

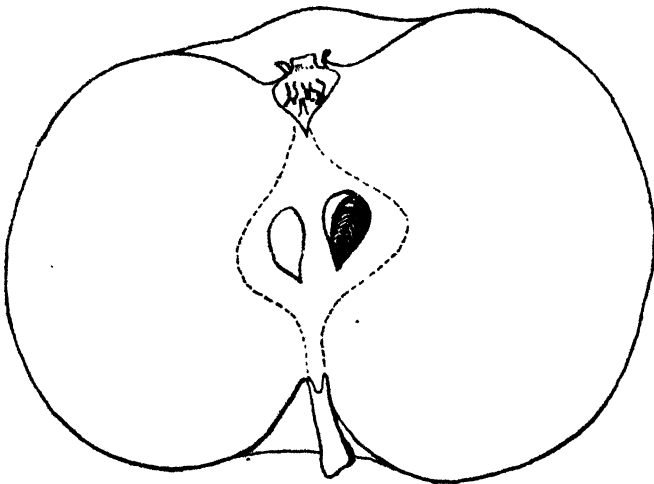
(See Article on "The Horn Apple" by Mr. Claude Fuller).

skinned lemons should be picked when green and about $2\frac{1}{2}$ to 3 inches in diameter, eternal vigilance being taken to prevent all bruizing. As with oranges, the stems should be cut short. They should be picked into large shallow boxes or trays. These are built into stacks in a cool room and the lemons allowed to colour up gradually. In this way the fruit can be held for months, and a tough, thin-rinded, juicy, useful fruit is secured like those that appear in our shop windows, all the way from the Mediterranean. Lemons will cure well in a cool, well-ventilated room, but care must be taken to keep out of a direct draught, and they should be occasionally looked over and all mouldy fruits carefully removed.

THE HORN APPLE.

THE Horn variety was introduced into Natal from the United States of North America, where it is also known as Leech's Red Winter. It is said to do very well at Balgowan and about the Karkloof, where it is held in high esteem by those who have it.

Although not classed as a "first rater" the Horn is a very good



The Horn, in Section.

apple and is fetching good prices upon the local market. It ripens in March and April and is a very good keeper, one gentleman at Balgowan having kept the fruit on into October without any special facilities. It is a heavy bearer, and whilst apt to suffer from the attack of woolly aphis whilst young is sufficiently vigorous to "grow through" the attack, the tree being vigorous with diverging branches.

The fruit is medium sized, upon the whole ranging from $2\frac{1}{4}$ to $3\frac{1}{2}$ inches in diameter.

This apple is flat or oblate with unequal sides. It has a pale yellow or greenish yellow ground colour striped over nearly the whole surface and clouded with red upon the sunny side.

The eye or calyx is open and the wide basin in which it rests somewhat irregular; the stalk is nearly half an inch in length and rests in a deep even cavity which is somewhat russeted.

The flesh is white, half tender and of a mild sub-acid flavour.

Grape vines can stand an abundance of pruning—the cutting off of useless wood. Leave only two or three buds on last season's growth and reap the reward the coming season. The sap necessary to nourish wood goes to produce fruit when the wood is reduced in amount.

If your land is too wet, and you're burdened with debt,

And incumbrance begins to accrue,

Obey Nature's laws—by removing the cause,

Drain your farm—or it will drain you.

—*Agricultural Gazette* (London).

When the lambs arrive they want a sheltered field to be in. An artificial shelter made of hurdles and thatched with long straw, fixed in the shape of a cross, is very useful. No matter where the wind blows from, there is always a sheltered side. The ewes are better out in the open field to lamb unless the weather is very severe.

THE COST OF A BAD COLLAR.—Some people have an idea that so long as a collar is sufficiently bulky and strong-looking it will serve for any horse. When ploughing time comes round, and the hardest work of the year commences, on to raw youngsters and the bloated elders go great collars. Of course, almost any horse after a fair spell from work may get a bit tender about the shoulders during his first few days at ploughing, but it is also not by any means uncommon to see quite a large proportion of the horses on a holding practically incapacitated at a most critical time through lack of care in getting well-fitting collars. The loss of time, and in ticklish seasons, of favourable sowing opportunities, in this respect must be very considerable. The subject is one that is not worth preaching about. There are three ways or so round the difficulty:—First: Let each horse have its own collar, and be sure that it fits him as well as possible. Second: Be sure that you so adjust the hames as to give him the fairest and most effective pull. Third: Take care of the collar, and keep it as clean as possible of cake sweat.

Forestry in March.

REPORT OF THE CHIEF FOREST OFFICER.

THE Chief Forest Officer, Mr. G. H. Davies, reports as follows to the Director of Agriculture and Forestry for March:—

In spite of the wet weather prevailing during much of the month of March, Foresters Leigh, Chilvers, and Meyer—at Entumeni, Zululand, Ingeli, and Pongola Bush, near Luneberg, respectively—have done some protective grass-burning, and Forester Symons at Giant's Castle has begun autumn brands for the game. The current month should see a good deal of this done at all stations.

A sign of approaching winter is the breaking up of the large herds of eland at Giant's Castle into small troops, though it seems early to do this in March, and cannot be necessitated by any scarcity of, or lack of nourishment in, the pasture. Forester Symons counted only forty-four head in the largest troop he saw. He reports that several old bulls should be shot—one especially had lost both horns. Permits for this arrived last year too late.

During a single patrol, on 23rd March, Forester Symons saw 57 eland, 22 oribi, and two rooi-rhebok, besides several large coveys of partridges. He has had some jackal hunting, but considers that it is necessary to have a dog—any mongrel—with a good turn of speed to assist the terriers. Game seems plentiful in demarcated Crown forests, but at the Ingeli Forester Chilvers reports that, while buck are often evident in the large Zuurberg, the smaller stinkwood—anciently a part of the other forest—draws scarcely any spoor even. This is probably due to the fact that the best part of this bush, after its costly survey and becoming as permanent Crown forest reserve, was sold during the period that followed the abolition of the old Forests' Department. Game are possibly unable to understand such unreasonable alterations, and, having no diagrams to show them the new boundary, distrust the whole of the smaller bush and seek refuge in the larger.

Forester Chilvers also reports that *paspalum* grass is getting a hold in some parts of the Ingeli, along old paths opening on to a farm where it has been grown. He hears that a farmer in Griqualand has purposely sown this grass in native bushes belonging to him to provide winter grazing. This may succeed in a way, but it is slovenly land-stewardship, as cattle are not good for bush, but is not good for cattle—who are always coming to grief in wild forest—and a rapidly-spreading grass like *paspalum* must effectively prevent the regeneration of trees by seeds.

During March Forester Tustin marked a special cutting-section of over two hundred trees in the Impetyene in response to the demand of a local resident who has professed his ability to work it despite all transport difficulties. The Forester assured me that it was worth while, and, of course, I am only too pleased to believe it. I have not yet found time to check the lists, but hope to do so before tree-felling begins.

Forester Eyles reports the late flowering of the White Ash on the coast of Alfred County, remarking that it is used to make fruit boxes. Since receiving his report your enquiry as to the distribution of this tree has reached me, and has been referred to Foresters Cruickshank and Eyles. The latter has sent me a small sample of the wood, which appears to be fairly straight-grained and may prove suitable for matches. The tree is, I think, *Balsamea Africana*, and Foresters' reports of it will be sent up on receipt.

Foresters Fernando, Tustin and Auld have been trenching badly-marked beacons, and Acting Forester Phipson, at Bulwer, has done some work of this nature. A little sawing has proceeded at the Xalingena.

At Umzinto natives were brought before the Magistrate for retaining forest licenses after expiry by Forester Cruickshank. At 'Ngoni Forester Foster had to take cases to Vryheid for offences committed in his forest district but in Vryheid Division. This is inconvenient, and must be so expensive to the Law Department that a delegation of authority for forest offences to the Magistrate, Ngotshe, seems to be indicated. At Empangeni, Zululand, Forester Tarboton has obtained the help of a native guard highly approved of by the Magistrate, Lower Umfolosi. The necessity for this is shown by the fact that during March Forester Tarboton has been down with an attack of fever, probably acquired during his February trip up the coast. This, together with his plantation work, prevented any forest patrolling by him during March. At Giant's Castle Forester Symons proposes the placing of notice boards to warn the public of the boundaries of the Game Reserve. I have called for a report as to the positions of the salient points for the erection of such boards and will then refer reports to you.

Several Foresters have attended the Militia Encampment in March. Such outings must be extremely beneficial from more points of view than that of recreation. The scout training will, however, probably prove the ideal one for foresters in charge of wild forest.

You cannot produce clean, pure milk in a stable where there is an atmosphere full of floating life. The milk that comes from the udder of a cow that is healthy is pure and wholesome. If it is off colour and impure the trouble lies in the insani'ary condition of the barn.

Natal Agricultural Union.

ANNUAL CONFERENCE, 1910.

REPORT OF PROCEEDINGS.

THE Annual Conference of the Natal Agricultural Union was held in April in the Town Hall, Pietermaritzburg, commencing on the 26th. The President, Mr. E. W. Evans, was in the chair; and the following delegates represented the various affiliated Associations:—Messrs. H. Bazley (Alexandra Agricultural and Horticultural Association); Thomas Fleming (Boston Farmers' Association); H. E. Essery (Chaka's Kraal and Umhlati District Farmers' Association); E. D. Gibbens (Dundee Agricultural Society); E. Marriott (Dronk Vlei Farmers' Association); H. D. Dinkelmann, W. L'Estrange (Dalton Farmers' Association); H. E. Mingay, W. Hale Walton (Donnybrook Farmers' Association); T. Burman (Durban and Coast Society of Agriculture and Industry); A. W. Smallie (Hatting Spruit Farmers' Association); W. Allkins (Inanda Agricultural Society); C. E. Hancock (Ixopo Agricultural Society); G. T. van Rooyen, M. Landberg (Krantzkop Farmers' Association); John G. Bester (Klio River Agricultural Society); H. Blaker, W. T. Wood: (Mooi River Farmers' Association); R. J. Lund (Little Tugela Farmers' Association); T. G. Colenbrander, Friend Addison (Lower Tugela Farmers' Association); C. H. Mitchell, H. Rethman (Lower Umzimkulu Agricultural Society); F. J. Smith, C. L. Lund (Malton Farmers' Association); Jos Ballam, B. B. Evans (Mid-Illovo Farmers' Club); James Scott, G. C. Mackenzie (New Hanover Agricultural Association); A. Meyer, Needsberg Road Agricultural Association; James King (Nottingham Road Farmers' Association); John Marwick (Richmond Agricultural Society); O. Hosking, D. C. Dick (Royal Agricultural Society of Natal); S. W. Cadle (Seven Oaks Farmers' Association); I. M. van Rooyen, G. Leuchars (Umvoti Agricultural Society); E. J. van Rooyen (Umvoti Farmers' Association); G. J. van Rooyen jun., P. H. van Rooyen (Upper Umvoti Farmers' Association); W. L. Oldacre, H. Wiltshire (Upper Biggarsberg Farmers' Association); John Rencken, D. W. Mackay (Weenen Agricultural Society); W. E. Cadle, P. J. van Rooyen (Weenen Farmers' Association); A. Von Levetzow (Vryheid Ward 1 Farmers' Association); M. Sandison (Gourton Farmers' Association); T. Hyslop (Life Member).

At half-past ten His Excellency the Governor arrived, accompanied by his aide-de-camp and the Prime Minister, Minister of Agriculture, and Minister of Railways and Harbours.

His Excellency, in opening the Conference, said he had taken a deep interest in the agriculture of the Transvaal, but naturally he was to a great extent a stranger to the condition of affairs in Natal.

Before proceeding further, he wished to expresse his deep regret, and he was sure it was also theirs, at the loss of Lord Selborne. (Applause.) Lord Selborne was, above all, the farmers' friend. (Applause.) He not only gave them good advice in the Transvaal, but they always felt that what they heard from him were words from a man who thoroughly well understood what he was talking about, and that there was no better English farmer than Lord Selborne himself. (Hear, hear.) He felt sure that whoever came after him, so far as agriculture was concerned, they would all suffer a severe loss.

He had been much struck, when he was in the Eastern Transvaal, when speaking to a much respected and very good farmer, by the reply to his question: "How do you class the Natal farmer, the Transvaal farmer, and the Afrikander?" He said so far as cattle were concerned, they could hold their own with anyone, but as far as mealie-growing was concerned the farmer from Natal had a greater knowledge.

He (his Lordship) had had the good fortune to go over the farm of Mr. Baynes, and he had read an article in the *Transvaal Agricultural Journal* regarding the work done by Mr. Mackenzie. He did not think too great praise could be given to men of the stamp of Mr. Baynes and Mr. Mackenzie for the splendid work they were doing, the one in dairy farming and the other in agriculture and wattles.

What struck him so much with Mr. Baynes was the broad view, and he should think the right view, he had regarding the Natives. He said South Africa was spoken of as a white man's country or a black man's country. It was a white and a black man's country.

PROGRESSIVE FARMING.

He (the speaker) wanted at present to understand the way Mr. Baynes dealt with the Natives on his own farm. All the responsible positions were held by Natives, who had done their work thoroughly well so long as they clearly understood they were not equal with the white man, and that they had to do what they were told. (Hear, hear.)

What had struck his Excellency very greatly in the Transvaal, and he imagined it was so in Natal, was the extraordinary recovery there had been in agriculture since the war. He had been speaking to one man who had had thousands of sheep, some hundreds of horses, and a great number of beasts, and he had lost everything during the war. He, like many others, did not grumble, but put his shoulder to the wheel to recover the position he had held before the war. (Hear, hear.)

NOTE.—We are indebted to the "*Natal Witness*" report for the substance of Lord Methuen's speech.

The farmers were working the best they could with the little money they had, and one farmer said to him if he would return in five or six years, when they had money enough to make use of fertilisers, he would see they would hold their own with any other farmers.

Of course, there had been every reason why they could not be able to hold their own with Canada, Australia, New Zealand and the Argentine.

He gave all credit to the Natal Government for having been the first to draw attention to the shipment of mealies. (Hear, hear.) They were in the infancy of mealies. He pointed out what Dr. Holden had done in the State of Iowa in America for the enormous increase of mealies by trouble taken to plant only sound mealies. Here and throughout South Africa they could do nothing wiser than help the Native to plant only good mealies.

He now came to a point in which he had taken great interest in the Transvaal, the Farmers' Association.

He was perfectly well aware there was no greater friend to the farmer than the merchant, and therefore nothing he said regarding the middleman applied to the merchants of Durban. When he dealt with the storekeeper as a middleman he had no bones to pick with him. He had been, in a good many cases, the best friend the farmers had. He had advanced them money; and in some cases he had got it back, in others he had not.

Where he had a bone to pick with the storekeeper was this, he wanted no middleman between himself and his mealies or anything else grown on the land. They should go straight from the producer to the consumer.

As far as anything like sheep dip, paraffin, and so on was concerned, he thought it was wrong that they should be sold by the Farmers' Associations.

In that connection he was not altogether at one with others who took an interest in the subject.

MEALIE CHARGES.

The Farmers' Associations, at any rate as concerned the Army, were of very great value. They, in the Army, would be uncommonly glad if they could buy their mealies and their oats, etc., straight from the Farmers' Associations instead of having anything to do with the middleman of Johannesburg, who ruled the roost, and did not allow them to get their mealies, oats and straw at the prices at which they could get them straight from the Farmers' Associations.

He could not understand why the farmers of Natal and elsewhere did not encourage the use of elevators for the shipment and transport of mealies from here to England. It was done in the Argentine, and in that vast country compared with which, after all, the mealies sold in South

Africa were a mere flea-bite. Why should they have to pay 1s. 4d. a ton for sending mealies to England when with the elevators it would only cost 4d. a ton. They could ship their mealies straight into the ship by using the elevator. Instead of so many sacks when the mealies arrived in England, they would be bought by the whole ship load.

In Natal ostrich farming was now making a good commencement, and their sugar, tea and dairy produce were doing well. He also recognised that in South Africa generally there was more land cultivated, more farms fenced, more attention was being paid to the crops, and much more trouble taken here, as in the Transvaal, in the proper breeding of sheep and wool.

When speaking with the Resident Commissioner of Basutoiland, he had been much struck with regard to the sheep. He did not suppose that anywhere in South Africa people quite understood the grazing of sheep as did the Basutos.

He now had to deal with a by no means easy matter. There was no rose without its thorns, but he did not think there was anything with more thorns than the agricultural rose. He was going to touch on East Coast Fever.

One thing he learned in the war more than any other was the vital error made in not recognising that if one sacrificed lives at first, it very often saved a great loss of life in the future. He said the same with regard to East Coast Fever.

He recognised perfectly the irritation caused by the rigid carrying out of the regulations, but he had been surprised at the large number of resolutions on the agenda for that Conference suggesting that the present regulations regarding East Coast Fever should be reduced.

What had struck him as remarkable were the resolutions from Weenen. In one resolution they urged that the restrictions should be taken off as regarded animals, and in another that the restrictions regarding the moving of skins should be still more rigid. (Laughter.) He could not understand how that moving about of skins could be anythink like as important as moving the animal with the skin on him.

He said clearly there was no danger existing for them in Natal, for the adjoining Colonies, and for South Africa, greater than this question of East Coast Fever.

It was their duty, and he would go with the Ministers in seeing it was carried out, to stamp out East Coast Fever by every means in their power, and if they did not choose to be strict about carrying out the regulations in force, and also seeing that they were carried out by the Natives, they were not doing their duty and were causing a danger to South Africa as well as to themselves. (Applause.)

If they imagined the Union Government was going to be a Utopia,

they made a very considerable mistake. Union Government would not help themselves.

If they thought that the moment Union took place responsibility would be taken from their shoulders, they were very much mistaken.

Proceeding, his Excellency said he had had great pleasure in visiting the Agricultural College. Nothing was more important, and he wished he could see that College, as was the farm at Potchefstroom, the centre of everything that had to do with agriculture. He believed the future of the agriculture of this country must be a combination of the science that they gained at the College added to the practical work that they gained on their farms. (Hear, hear.)

HORSE BREEDING.

He would now digress from what was purely agricultural work to horse breeding. He had had a great deal to do with the encouragement of horse breeding in the Transvaal, and he had been bombarded with proposals for farms for horse breeding. His experience regarding the Government farm in practice had not been altogether happy. He had no wish to have any more farms on his hands. He felt certain it would be very difficult for him to persuade the War Office to organise any horse-breeding farms in South Africa, but what he had done, and it seemed to him perfectly simple and he hoped wise, was to get the War Office to allow him to sell about a hundred mares at £20 apiece. These mares otherwise had to go to Johannesburg, where they would be sold by auction perhaps for £25, and end their lives probably in misery and pain in some cab in Johannesburg. The proposal he had made had been met more than half way by the farmers of the Transvaal. The result was that the mares he had to sell at the next auction were already disposed of. He saw no reason why the breeding they had had originally in South Africa should not come back. It was at present far below what was worthy of the country.

His Excellency inveighed against the weedy, wretchedly-bred stallions that were frequently used, and cautioned farmers against them. They would have a chance of getting good mares from the Government as long as cavalry remained in the country. He suggested that the Government should see that they had good stallions, belonging to the Government, that they could issue at a low cost to serve the mares.

There was no reason whatever why South Africa should not be the breeding place for the Army in England, and they should be able to sell their horses to other nations as well. Horse breeding should be one of the greatest assets of South Africa. (Applause.)

Canada has already gone ahead greatly, and the people had received considerable assistance. The Canadian Government was spending £30,000 a year in the encouragement of trade with South Africa by subsidising a monthly service of ships.

Sentiment alone could not preserve the unity of the Empire. Close trade relations were needed between the different parts. They recognised Sir Wilfred Laurier's endeavours to bring this about so far as Canada was concerned. It was this bigger Imperialistic aspect of agriculture that South Africa should foster if it was to do its share towards the future prosperity of the Empire.

COMBINATION.

It was not enough to agree, it was necessary to act. In the past there was every reason for nothing being done, but now, with the advent of Union, let them take steps to emulate the good work done by Canada.

He thought it was essential, just as it was for the children of the same parents to be fond of each other, that there should be that family feeling and that they should be able to think, not only of the mother country, but equally of each other.

In this country they had a great advantage as regarded the Ministers. If they thought of those who occupied the position of Prime Minister or as Ministers of the different Governments, they would see that the large majority were connected with farming. Let them take their own Prime Minister, Mr. Moor, and there was General Botha and Mr. Merriman. He did not know about Mr. Fischer, but the others were all farmers, and so were many of the Ministers serving under them. Therefore they need have no fear of agriculture not being thought of.

What was that agriculture of South Africa? Many people spoke about the great assets of gold and diamonds. What did they do in both those cases? They took everything out of the earth and gave nothing back.

In agriculture they took out of the earth, it was true, a great deal, but they had to give generously to her. If they treated her with the same kindness as she was treating them, they put quite as much and more back into the earth than they took out.

Whereas in the one case there would be a time when the mines were finished, agriculture would last for ever, and year by year it ought to grow.

Of course they would have to study dry farming, though perhaps that would apply more to some parts of the Transvaal than to Natal. He was certain when the Transvaal knew how to preserve her rain and cover it properly with a mantle, she would derive the immense benefit which had been derived in the States of America.

There was one thing required of them all, white and black, and that was not to have a soft shoulder. There must come a time when the Native locations would have to learn that it would not do to sit still and make the women and children do the work. There would come a time when there would be put a stop, to a great extent at any rate, to indentured

labour, and they would have to supply the want with Native labour, and the Natives would have to realise the fact that they had to work. Africa was no place for lazy men, were they white, black, or piebald, Dutch or English. (Applause.)

They all had to work. If agriculture was to go forward in South Africa, that fact had to be realised. The black and the white man were equal in one thing, the need to work. It was the only way in which agriculture could be forwarded in South Africa, and by it they would be able not only to be equals, but to show the way to those other great parts of the Empire, namely, Canada, Australia, and New Zealand. (Loud applause.)

His Excellency then left the meeting.

PRESIDENT'S ADDRESS.

In moving the adoption of the Executive Committee's report, the President said:—

I have great pleasure in welcoming the delegates from the affiliated Societies who are present at this, the 19th annual Conference, and it must be very gratifying to those who so long ago initiated this movement to find the interest continuing unabated through so long a period.

Such a Union as ours is of inestimable benefit to the farming industry, bringing together as it does the selected representatives of the different communities to confer together for the common good.

There is, as usual, so much to consider, and one or two matters of such supreme importance, that I shall avoid detail as much as possible, and only lightly touch on the year's work, and on the statistics relating to farming, which, as you know, are published fairly regularly, and are available for all.

Speaking generally, the year past would have been a good one, but for the continued spread of East Coast fever, as the season has been favourable, and stock, with the exception noted, very healthy.

But this scourge is so widely distributed that hardly any branch of farming exists unaffected directly or indirectly by its presence, and I shall later on in my address refer more particularly to the position as it exists now, and as it is likely to be under Union.

Horses have had a good year, and stand at satisfactory prices. There is

a good demand for military remounts, and this is likely to continue and increase, as circumstances combine to make South Africa an important military station for years to come.

Breeders should make their own inquiries on this subject, but I see no reason why we should not produce and sell at remunerative prices the horses needed by the Imperial Government for South Africa at least.

Cattle, excepting for East Coast fever, have done well, and our sad experiences all go to show the paramount importance of this branch of farming.

A PASTORAL COUNTRY.

Natal is essentially a cattle country, and, with the tick eliminated, as I believe it can be, would be most successful on the lines of dairying and fat stock-raising.

But slowly our herds are being depleted by this terrible scourge, and, so far, all attempts to find a cure or preventative have failed, so that unless far more vigorous efforts can be made than those attempted by the present Government, our position is hopeless.

Sheep, in some districts, are being taken up again, where the cattle have died, and it is likely that this industry will receive greater attention in future.

If systematically worked, and with definite object in view, sheep farming may be as successful here as in the more purely wool-producing colonies.

Natal ought to become as famous for cross-bred lambs as New Zealand, and I have no doubt we shall discover this in time.

Pigs are still produced in insufficient quantity for one bacon factory, and South Africa is still importing pig products by the ton.

It seems almost incredible that a mealie growing country such as this should go on neglecting so obviously important a by product as this.

Almost every farmer grows some mealies, or other suitable food. Good sires are reasonable in price, the country is healthy and suitable, the market extensive, and the price remunerative.

Ostriches.—A considerable extension of this neglected industry has taken place during the past year. Mr. Thornton, the Cape expert, having visited Natal and advised that a considerable portion of the colony is suitable for the production of high-class feathers. Some of the best Cape ostriches have been brought in, and I believe we shall prove that these will yield good returns, although it is advisable to utter a word of warning against the folly of purchasing low class birds.

DAIRYING.

Dairying is increasing in favour with all farmers who have still got cattle, and under our special conditions perhaps nothing is more attractive or satisfactory to the Natal farmer.

Our local creameries are extending their operations to the neighbouring colonies, where their business methods are appreciated to such an extent that the great increase is chiefly due to Overberg extension of trade.

Our own expansion is, of course, checked by East Coast fever, but that gone, and the ticks a thing of the past. Natal farmers would have a great advantage in the ability to grow abundant feed for both summer and winter, and I look forward to a time when a great part of Natal will be covered by small proprietors making a comfortable living out of the general farming for which our colony is so suitable, and of which dairying is a most important branch.

Mealies go, as it were, hand in hand with dairying and pig-raising, and I would like to see this product more used in these forms than merely for export.

Export has come to stay, and we shall in a very few years be one of the most important maize-growing countries for oversea consumption, but I hope we will always keep in mind the importance of feeding as much as possible at home, and selling the produce in the form of butter, cheese, bacon, and meat.

The continued fertility of the soil has to be considered, and animal production and feeding are necessary economic factors to this end.

The season has been a good one for mealies, but a long dry spell about planting time limited the area, and I hardly think the production will be greater than last year.

Wattle-growing is still expanding, and the prospects seem bright, buyers of bark being anxious to secure supplies ahead at good prices.

I saw a most excellent exhibit of South African leather at the Johannesburg show, tanned with our bark, and at the same show hand-made boots of the finest quality from this leather.

Surely, when we have all the necessary materials here, it is high time for the tremendous importation of leather goods to be checked, and ere long to disappear.

FRUIT INDUSTRY.

Sugar has had another good season, and is progressing by leaps and bounds, the planters having discovered the wisdom of adopting up-to-date methods.

Fruit has not had a very satisfactory year, and Mr. Fuller's report is not encouraging.

To my mind, this industry will have to be reorganised, the old pest-producing orchards eradicated, and the business re-started on sound business lines, as in California.

We have a climate well suited to fruit-growing of certain kinds, but there is not enough knowledge available at present.

Native labour has been fairly plentiful and satisfactory during the year, but I would like to repeat my warning of last April.

With returning prosperity an increasing demand will set in, and he will be the lucky farmer who has in advance arranged for a reliable and contented supply.

We would all be glad, no doubt, to utilise skilled white labour and labour-saving appliances as far as possible, but the native will always be our great stand-by, and we must see to it that we are not left in the lurch when the need is greatest.

Tree-planting.—You will see and appreciate the very satisfactory entries which have resulted from the competition initiated by the committee elected last year.

I have now the pleasure to announce that the Government have generously provided £1,000 for this purpose, and we may look forward to an extension of this competition for several years to

come, with increasing entries every year, till an appreciable difference in the appearance of our hill sides will be patent to all beholders.

Mr Orlando Hosking, the originator of the idea last year, is also the member whose efforts induced the Government to help this good cause, and we all owe him a debt of gratitude.

In thus encouraging forestry we are building better than we know, for its value to a country is incalculable, and the timber of the world is decreasing so rapidly as to cause something like consternation among consumers.

FERTILISERS.

Phosphate Rock. — A considerable quantity of this fertiliser has been tried during the past season, with, I believe, varying results.

I did not refer to this matter last year, but have since made inquiries in other countries as to its use.

Finding that in Canada after ten years it is deemed useless, while in some of the middle and Southern United States the report is favourable after a trial of twelve years, it is evident that the soil conditions have a good deal to do with its success or failure.

As there is a great quantity of this fertiliser, I think the Government should commence a series of careful experiments such as have been carried out in America, which no private individual can do, and which may be of immense benefit to South African agriculture.

Mealie Union. — Most of you will have read the report of the annual meeting of the Natal Co-operative Mealie Growers' Union, and those of you who are not members will no doubt speedily join, as by this time its advantages are obvious to all.

What I would like to specially point out is that its objects are not necessarily confined to buying and selling.

At its last meeting the question of co-operative steam-ploughing was discussed, and information put in the way of communities of agriculturists who might see their way to adopt this progressive principle.

It has also been arranged to have a demonstration of motor-ploughing and traction, to which all members of the Union will be invited, and I mention this as showing the possibilities of such an organisation and the advantages of membership.

Finance. — The Natal Agricultural Union ought, however, to be the direct moving spirit in these and similar advances, but unfortunately we are limit-

ed by our income to a very restricted range of usefulness.

A resolution will be submitted for your consideration, asking the Government to grant an annual sum of £1,000, as has been done for some years past in the Transvaal, but whether you adopt this system of raising funds or provide what is necessary yourselves, more should be done to enable the Union to extend its scope and adequately remunerate its servants.

Your secretary has had an arduous year of office, and the work done by him is sadly underpaid; it is not fair, nor consistent with the dignity of our Union, that such should continue to be the case, and I appeal to you to come to a practical conclusion in considering the resolution under notice.

Railway Rates. — We have from time to time been promised substantial reductions in railway rates, particularly for South African products, and at last something satisfactory is being done.

Passenger fares in Natal are being reduced by about rates on show exhibits by one-half, while South African produce rates are brought into line with the other colonial systems, which we have all along maintained were lower than those of Natal.

CLOSER SETTLEMENT.

Closer settlement, under Mr. Deane's fostering care, has made steady headway during the past year, and even the doubters are coming to believe that South Africa may after all be a country for the smaller white farmer.

I am one of those who consistently upheld the policy of closer settlement to a considerable extent; though we may not have the vast, continuous tracts of grain lands which Canada has to offer, yet we have soil which will grow mealies from the coast to the high veld and a climate second to none in the world.

By first selecting land near railways and wherever possible ploughing the land, and afterwards extending as results justify such a course, we shall, I am convinced, be able to settle a contented and moderately successful population within our borders.

If we are ever to compete in the markets of the world we must have better means of inland communication, both rail and road, and this can never come about till the population justifies the expenditure of the capital necessary for such work.

Last year it cost as much in my own case to transport mealies eighteen miles to a railway station, as from that station 175 miles to Durban and thence 7,000 miles by sea to Europe, and while this state of things continues our country can never seriously compete.

What we need is men on the land, and these obtained prosperity will follow.

Closer settlement means, as I have shown, cheaper means of communication, but it also means better education for country children, technical training and instruction for adult farmers, social amenities unheard of now in country places, to say nothing of increased values in land.

I have a letter (referred to in your executive's report) from an organisation engaged in bringing out young fellows of good education, and with at least £1,000 capital to settle in our country.

These young fellows want homes for a year or two to enable them to learn something of farming in this country before they settle down, and I hope any of you who are approached to accommodate such will do all you can, for these are the kind of men we want. Of course, they will be willing to pay a reasonable premium for the help they receive.

EDUCATION.

Agricultural education is what we need most of all, and this is one of the great benefits I expect we shall derive under the Union which is now upon us.

The Transvaal has nobly shown the way, with the O.R.C. in close attendance, and if we are (as General Botha said the other day) levelled up to them, we shall gain inestimable benefits.

Until the last few months Natal has been in a parlous financial state, so that it is perhaps not fair to judge the Government harshly, especially when the depressing effects of East Coast fever are fully allowed for.

But there has been a want of boldness, of ideals, of belief in our own beautiful, capable country, and of continuance in any policy pertaining to agricultural education, and this I firmly believe will be entirely altered under Union.

Time will not permit my going into detail, but we all know how the energy and enthusiasm of the Transvaal Agricultural Department has become proverbial in South Africa, and now a commencement will be made with an Agricultural College on the lines of those

splendid institutions in the middle west of America, the benefits of which we shall share.

Many other advantages will accrue to us from Union, which are too obvious to need pointing out, and certainly an era of steady prosperity is dawning for South Africa; but it must not be supposed that these will come without watchfulness and effort; our wisest and strongest men will be needed to carry on the business of this Union during the coming eventful year, for there will be times when Natal will have to look after her interests when conditions are being altered, and the future control of agriculture being settled.

EAST COAST FEVER.

This will be particularly the case with regard to East Coast fever, which has assumed a sinister importance in this colony unequalled to the farmer by any other question.

You will have seen by the executive report and annexures thereto that we have been struggling all the year to get something definite done on the lines laid down in our resolution of last April.

Making due allowances for the financial stress that the colony has been suffering from, I have still, regretfully, to place on record my opinion that much more might have been done by the Government.

Admitting that the colony was unable to provide the means of stamping out the disease as we in our resolution desired, there has not been that determination to place the seriousness of our condition, and the danger to others, in such emphatic form before the other colonies, that they would have helped us.

I do not wish to make detailed charges against the present Government but I say now that the disease can yet be controlled, and that I am confident that the Union Government will see to it when it comes into power.

It has spread into the Cape, it is in the Transvaal and Rhodesia, and it will paralyse the progress of South Africa and the prosperity that should surely be ours if not attacked with the greatest rigour.

Gentlemen, I have had a long experience of this Government, and I expect nothing effective from it, but we must be up and doing, and ready to put in an earnest and urgent claim for assistance and action, not only for ourselves but all South Africa, as soon as ever Union is accomplished.

The position is clear; monthly the disease gets a greater hold on our herds, and nothing is done to even check its deadly career, and unless a fighting policy is initiated and carried out thoroughly, regardless of any person, white or black, we shall drift from bad to worse, until our cattle are all dead, and half the farmers ruined.

Such a policy was outlined in the Advisory Commission's report, and if the present Government will not or cannot act upon it, then I recommend you to take it on without delay to the Union Government, who, I am confident, will be broad-minded enough to see that it must and can be carried out. The report of the Advisory Commission, strongly urging action on practically the same lines as outlined in our resolution of a year ago, was sent on to the Government six weeks ago. On the 18th instant a reply was received stating that the report was then being circulated amongst ministers preparatory to its consideration by the Cabinet, and at the time of writing nothing further has been communicated. It is therefore, to put it mildly, very unlikely that anything will be done by the Government before Union.

I can see and sympathise with the difficulties which have beset the present Government in this matter, but in all seriousness I am sincerely glad that their period of office is at an end, and that the Central Government will have to take this problem up.

REPORTS.

The usual reports have been received from the heads of the different branches of the Agricultural Department, and will be read separately.

I ask you to join with me in thanking these gentlemen heartily, both for the reports and the work they are so thoroughly doing for the benefit of Natal agriculture, often under serious disabilities, for the prosecution of technical work during times of financial stress and shortened votes is both harassing and unsatisfactory.

The Press, including the "Agricultural Journal" have all worthily contributed to our agricultural progress during the past year, and the various articles therein appearing have proved helpful to those who find by practical experience that the farmer has never done learning.

Mr. Eadie, your secretary, keeps his enthusiasm ever fresh, and when we consider that in addition to this Union's work, he has also undertaken an additional heavy burden in the secretaryship of the Inter-Colonial Union, at a merely nominal salary, I am sure you will all heartily agree with me that he deserves our warmest thanks.

I would like here to tender a hearty welcome to the representatives of Het Congress, and to regret that we have been unable to see eye to eye with them in the view taken of the functions of our Union.

Our Dutch friends believe in running their agricultural problems and politics together, while this Union has from its inception eschewed politics in any form.

This being a fundamental point with us, it was found that the cleavage had to remain, but the two organisations understand each other, and that the friendly terms on which we now stand may long continue as our earnest wish.

And now, gentlemen, in conclusion, we may look back with pride on the growth and stamina of this Union of ours, founded in the day of small things, and supported through good and evil days by loyal and willing workers, till we now stand on the threshold of great happenings for South Africa.

The old spirit of unbelief and distrust is gone, never to return, and we all know that we have the making of a great agricultural country-aye, and a great nation.

An ever-increasing band of enthusiasts there is determined to have the best knowledge the world provides, and a nucleus, also increasing, of practical farmers who are insatiable in their desire to have that knowledge brought them.

We shall see ere long the travelling experts on soil culture, irrigation, forestry, dairying, co-operative stock feeding at our gates, and in our homes, as is done in America, not waiting hundreds of miles away till one visits their laboratories.

Co-operation, closer settlement, and higher cultivation will be the key-notes of the future, and with the resulting efficiency we shall have our share of the markets of the world, and the prosperity to which such growing efficiency will entitle us.

In the course of his address, Mr. Evans said that a reply had been received from the Government in regard to the East Coast Fever resolu-

tions passed last year, stating that the dipping regulations have not been finally approved to the Government, but it is hoped to publish it very shortly.

The Chairman's address was received with applause.

Mr. H. Blaker moved a vote of thanks to the President for his very comprehensive address.

In seconding, Col. Leuchars said the address was one of the most practical they had ever had. He would like to see Mr. Evans appointed for another term of office.

The President thanked them for their vote of thanks, and hoped his remarks would have some good effect—it was needed, at any rate. (Laughter.)

The Secretary then read the various reports which had been received from the Experts and the Department of Agriculture.

A hearty vote of thanks was passed by the Conference for the reports furnished by the Experts concerned.

The Executive Committee's report was the next matter to come before the Conference. It was moved that consideration of the report be postponed to a later stage of the proceedings. This was carried.

(To be continued.)

The pig is raised only for its meat, and this being the case, the object is best subserved by turning it into meat as soon as possible.

Economy of production with pigs requires that they be not fed longer than is absolutely necessary to allow of their attaining good weight.

The amount of the rations that should be supplied to the brood sows can best be determined by the condition of the animals, which should always be one of thrift.

If the sheep are allowed to get out of condition or to lose flesh the wool deteriorates in direct proportion, and there will be a weak place in the fibre, no matter if their condition is afterwards improved.

The shape of the sow to a considerable extent determines her value as a breeder. The low, choppy sow is seldom a good breeder. She does not produce a good-sized litter, and neither are they thrifty pigs. The sow should be long and deep bodied.

Experiment Farm Reports.

CENTRAL EXPERIMENT FARM.

FARM MANAGER'S REPORT.

THE Farm Manager, Mr. A. Reid, reports as follows for the month of March:—

Hay-making has been a considerable item in this month's work, 2,000 bales having been secured and put under cover, the quality of which is very good. The weather was not too favourable for this work, rain having fallen on 22 days, totalling 4.79 inches.

Potatoes have been harvested, the following results being obtained:—"Up-to-date," 2,778 lb.; "Early Rose," 3,774 lb.; and "Carmen," 4,263 lb.; in all 10,815 lb.

Hand and horse-hoe cultivation of swedes, carrots, turnips and rape has been attended to; and the work of interplanting maize crop with the seeds mentioned last month has been continued.

Labour has been employed in general weeding, cleaning and trimming of the avenue, etc., when weather has proved unsuitable for field work.

The necessary machinery for ensilage-making has been put into place, and arrangements made for an early start with this work.

All draught animals are in good working condition.

WOOL EXPERT'S REPORT.

The Government Wool Expert, Mr. J. J. McColl, reports as follows to the Director of the Division of Agriculture and Forestry:—

In the early part of the month I had all the fencing which had been washed down by the heavy storm in February, re-erected on a new line further back from Reit Spruit than originally, so as to avoid a repetition of the damage. On the completion of this work, I had the wire-netting put up on the existing fence all round the upper portion of the farm so as to include the grazing only, thus leaving the forestry lands outside the sheep-run.

An unfortunate feature of the month has been an outbreak of nodular disease in some of the flocks, the Hamps and Haired Persians being the most severe sufferers. The Merino ewes have not been affected at all, while the Lincolns have only suffered slightly.

The assistance of the Veterinary Department was requisitioned, and an officer from Allerton came on the Farm and made a thorough inspection of the flocks, also having *post-mortem* examinations made on individual sheep from each lot.

As a result advice as to the management and drenching has been received which will be carefully carried out. Fortunately the upper portion of the Farm, now fenced with netting, is absolutely clean veld, and it is my intention to move the Merino and Lincoln ewes up there immediately, where they will lamb down. I shall endeavour to leave the major portion of the grazing near the homestead free from sheep for at least twelve months, and by following the same practice with the balance in due course, I am hopeful of getting the Farm comparatively free from this disease. The Merino rams have already been moved off the Farm for a change of veld, which will be very beneficial for them.

During the month the maggot-fly has kept us fairly busy owing to the continued damp weather with occasional hot days. Sheep with body-wrinkles have been badly attacked, and although the intervals between the examinations have precluded the formation of sores, still the itching and worry from the maggots were trying to the unfortunate sufferers.

I am hopeful that we are now past the season for this pest. Ticks have not been the trouble which I anticipated they would be, and the sheep are comparatively free at the present time from this parasite, consequently I will not dip until after the lambing, and not then if not an absolutely necessity.

The draughting-yards have been completed, and I am at present making the gates necessary. I have already made and hung six of them; there are twelve more required to complete the work.

In this connection I may state that I shall be happy to supply sketches and measurements of this yard, in which 2,500 sheep can be handled in comfort, to any farmer making request for same.

The work of dismantling and removing the fence round the wattles on Hilton Hill has also been taken in hand. It is my intention to use up the material in closing up the spaces east and west of the western orchard and the adjacent fences, thus obtaining an additional paddock.

All the work of the month has been carried out by my assistant, J. C. Walker, myself, and two Kafirs.

As the students have now come into residence at the College, I shall be enabled to push all the necessary work along with the additional assistance which I shall receive.

BIOLOGIST'S BRANCH.

Reporting for the months of January, February, and March, the Biologist, M. J. Fisher, writes:—

At the beginning of January I was assisting the House Master with the survey of the grounds surrounding the College for the installation of

a new sanitary system. When about the middle of the survey I took a chill and was down at Grey's Hospital in Pietermaritzburg for six days, after which I returned to Cedara and assisted in the contouring of the above survey, and made a tracing of the plan of the part surveyed.

During February a large portion of my time was devoted to reading articles in the various agricultural journals upon subjects in connection with my work here. I also commenced a botanical analysis of the veld herbage at the farm Riversdale, Howick, when I was called to Winkel Spruit to take up my course of lectures down there.

I started the subject of agricultural botany, and the lectures given on the subject have included: The structure of the seeds of Dicotyledons and Monocotyledons as shown by the bean and the fruit of the wheat; Germination, conditions of, and changes taking place during it; The external structure of roots, their method of branching, etc.; The external structure of stems, leaves and buds and the development of fruiting spurs; Stem modifications; Plant nutrition and its investigation by means of sand and water culture; The absorption of nitrogenous food material; Weeds, their manner of dispersal, eradication, etc.; The improvement of plants (1) by selection, (2) by cross-pollination. Whilst down at Winkel Spruit I made a botanical analysis of the veld herbage there, and since returning to Cedara have finished the one started at Howick. The results of each of these investigations have been forwarded to you in special reports.*

On the Farm I notice there are several insect pests at present. Woolly Aphis is present in the orchards, whilst the turnip crop is attacked by *Athalia spinarum* (the turnip saw fly), *Plutella maculipennis* (the diamond back moth), and *Phyllotreta crucifera* (flea beetle). The horse bot fly *Gastrophilus equi* is also busy on the Farm at present.

CHEMICAL BRANCH.

The Chemist, Mr. W. R. Simpson Ladell, reports to the Director of the Division of Agriculture and Forestry as follows for the month of March:—

I resumed duty at the end of February after my return from sick leave. During the whole period of leave necessitated by my wife's illness, my work had been carried on in the Government Laboratory, Durban, Mr. Neville and his assistants very kindly undertaking the work.

There have been no samples of seeds submitted for purity and germination tests during the past three months.

Sixteen samples were examined in the month of March, the most important being four samples of hay from the Central Experimental Farm, paspalum hay, phalaris hay, and two samples of veld hay, one cut last December and one cut this March. They gave the following results on analysis:—

* The Reports referred to will be published in the next issue.—Ed.

PERCENTAGES ON SAMPLES AS RECEIVED.

	Paspalum.	Phalaris.	Dec. Veld.	March Veld.
Moisture ...	15.5	14.6	12.55	15.3
Soluble Ash. ...	2.02	3.93	1.83	2.29
Insoluble Ash ...	2.92	1.05	2.45	3.92
Soluble Albuminoids ...	1.15	0.94	0.44	0.21
Insoluble Albuminoids ...	4.77	6.75	3.69	3.92
Amides ...	0.99	0.88	0.64	0.51
Digestible Fibre ...	30.12	30.01	34.75	35.60
Woody Fibre ...	35.26	29.39	33.76	32.44
Fat ...	1.04	1.62	1.37	1.53
Chlorophyll, etc. ...	6.23	10.23	8.52	4.28
	100.0	100.0	100.0	100.0
Total Nitrogen ...	1.15	1.42	0.80	0.77
*Nutrient Ratio ...	1 : 5.57	1 : 4.44	1 : 9.25	1 : 9.43
†Nutritive Value ...	38.93	41.87	42.35	43.50
‡Food Units ...	49.02	53.73	48.82	50.05

* Ratio of albuminoids to digestible carbohydrates.

† Fat x 2.3 x amides x 0.5.

‡ Sum of albuminoids, digestible carbohydrates—Fat x 2.3 and amides x 0.5.

§ This is the method of valuation adopted by A. Smethson, of the Lancashire Agricultural Society, and is obtained by calculating that fat and albuminoids are of equal food value, and are equivalent to 2.5 times the quantity of digestible carbohydrates, to this I add the food value of the amides, which I take to be equivalent to half their weight of carbohydrates.

The above analyses show that the particular samples of veld hay examined are very useful foodstuffs in respect to carbohydrates, but the phalaris and paspalum hay would make a much better nitrogenous feed. The phalaris hay would appear to be a more valuable foodstuff than the paspalum.

A sample of meat guano from G. J. H. Webster, of Bisley, showed the composition:—

	Per cent.
*Moisture and organic matter ...	65.82
†Total calcium phosphate ...	29.62
Corresponding to phosphate oxide ...	13.54
Sand ...	0.23
Calcium carbonate, etc. ...	4.33
	100.0
*Containing nitrogen ...	6.14
†Containing citrate soluble P ₂ O ₅ ...	10.54
„ „ insoluble P ₂ O ₅ ...	3.0
Total P ₂ O ₅ ...	13.54

This would be a very useful manure, especially for soils deficient in organic matter.

A sample of phosphatic rock contained 30.12 per cent. calcium phosphate, corresponding to 13.8 per cent. of phosphoric oxide. This is one

of the few specimens of phosphatic rock examined in this laboratory which have proved to be of any value.

WEENEN EXPERIMENT FARM.

The Curator of the Weenen Experiment Farm, Mr. E. R. Gessner, reports as follows for the month of March:—

Ploughing operations were started on new block adjoining the Railway Station with a single furrow plough 75 eagle, and, of course, progress was very slow indeed. I borrowed a double furrow Columbia and cross ploughing each section. The result seemed fairly good, disc harrowing and grading following in both cases, many fresh roots thus being brought near the surface and removed. The general condition of the soil this year is far better than last, in consequence of the above cultivation. Only one ploughing preceded planting in 1909. Section A, Main Station, has been three times ploughed since November, and is now in good tilth for planting. Sugar beans, one acre, occupy part of B Section, and look very promising. The remainder will be turned over as soon as possible, also all other sections available. Lucerne looks in a very healthy condition, but far less growth has to be recorded than in 1908-9. Grass since December has given quite a lot of trouble, probably due to seed coming down in the irrigation water. On the distance of planting and drainage section lucerne, tile drainage still shows to great advantage. Owing to proposed Tick Fever regulations, as regards railway permits, this crop in future must be harvested with mules and horses. The Orchard has required a good deal of labour to keep clean. The mower has been kept busy cutting down the grass between the rows of trees, and hand hoeing has been done around the tree trunks. The fruit crop has been very poor, and this is probably not entirely due to bird pest, as already reported. Fruit fly in all stone fruits was checked by the prompt removal of all windfalls. A few young pigs have been quite useful in this respect. Pears are now beginning to fruit. One pear of a William's variety, and a good show one (Kieffer Hybrid) being the entire crop. Apples were checked by hail. Cherries blossomed heavily, but did not fruit, this being the same result as last year, though water was applied at that stage: possibly the heat is the cause. Grapes were a failure, the rain causing them to split. Part of last year's crop of Yorkshire Hero peas (15 bags) were sold to a Maritzburg firm, realising £2 per bag of 200 lbs., a slight deduction being made in five sacks that were grub eaten. The ground nuts planted close to the Vineyard and between the rows of fig trees are doing fairly well. These I hope to harvest by the end of April. Three students, namely, Clayton, Thorburn, and Green, were at the Station, but left for Cedara at the end of March. Mules are in good condition, also oxen, although the latter have had plenty of heavy work lately.

Natal Bee-Keepers' Association.

MONTHLY NOTES AND COMMENTS.

By the Hon. Sec., W. C. MITCHELL, Cedara.

MEMBERS will, I am sure, be pleased to hear that the sub-committee in charge of the show have been able to increase the amount of the prizes as given in the prize schedule issued. The following amended schedule is therefore published:—

Class 1.—Exhibit of hives and appliances to occupy not more than 30 square feet, 1st, 20s.; 2nd, 10s.

Class 2.—Any Colonial-made appliance, other than hives, price to be stated, 1st, 20s.; 2nd, 10s.

Class 3.—Beeswax, not less than three pounds, 1st, 15s.; 2nd, 10s.; 3rd, 5s.

Class 4.—Foundation comb, Colonial-made, not less than 5 pounds, 1st, 15s.; 2nd, 10s.

Class 5.—Comb honey, 12 sections, 1st, 12s. 6d.; 2nd, 7s. 6d.; 3rd, 5s.

Class 6.—Comb honey, 3 shallow frames, 1st, 15s.; 2nd, 10s.; 3rd, 5s.

Class 7.—Liquid honey, 12 one-pound bottles, 1st, 15s.; 2nd, 10s.; 3rd, 5s.

Class 8.—Granulated honey, 12 pounds, 1st, 15s.; 2nd, 10s.; 3rd, 5s.

Class 9.—Observatory hive, with bees, 1st, 20s.

Class 10.—Exhibit of honey, wax, etc., staged for effect, to occupy not more than 3 feet by 3 feet, 1st, 15s.; 2nd, 10s.; 3rd, 5s.

Class 11.—Educational exhibit.

The following prizes have been kindly donated to the Association:—

Class 5.—All prizes presented by Messrs. Shippey's Stores.

Class 9.—Prize presented by Messrs. Steel, Murray & Co.

Class 10.—All prizes presented by Messrs. Parker, Wood & Co.

* * *

With regard to the proposal to arrange a social fixture of some kind by which members could get into touch and become known to each other, but few suggestions have come to hand. The principal difficulty would appear to be time and place for such a meeting; country visitors want to spend all their available time at the Show, and would be leaving for home probably before the evening. Unless something more acceptable can be arranged before next month's notes, it is likely that some central meeting place will be fixed in the Show Ground. Fuller details will appear in next month's notes.

Hon. Secretary, N.B.KA.

DEAR SIR,—Many thanks for Show schedule, which duly came to hand, and of which I have taken a careful note; I am very pleased with it, and I am sure it gives members a fine opportunity of entering at least a few of the classes. Although my own product is almost entirely confined to "extracted," I hope to take together enough to "get in" in half a dozen classes.

I trust every bee-keeper, and especially all our members, will try to make a show in order to help the craft along and catch the public eye. The prize list gives everyone a chance to get a place somewhere.

Bee-keeping in my part may be said to be off for the season; very little honey has been coming in for the past few weeks unless where a crop of late pumpkins are in bloom. These I look upon as the finest hopey plant in my neighbourhood, and the season just over has given ample evidence of their honey yielding qualities. The honey, which is white, or nearly so, in colour, has a rich mellow flavour without a shadow of after-taste or tack about it. The pumpkin's greatest drawback, strange as it may seem, is the amount of pollen it yields, far in excess of the needs of the most populous stocks.

I have heard of some fine swarms about so late as the 25th of March. Poor little creatures, leaving their comfortable, well-filled home so late in the season! One wonders what will become of them unless fate throws them in the way of a bee-keeper who knows their needs, and I regret to say the latter is not an overcrowded calling in this country by any means. After all is it not a little singular that Nature, having taught them so much, should fail them at such a critical moment, in giving them judgment in the matter of swarming? While a late swarm near the Coast may pull through till the summer comes again, there can be no hope for such on the high veld if left to their own resources.

I trust you will have a bumper entry for the Show, and that it may be the beginning of a series of exhibitions which will grow in public favour and bring the bee-keeping industry up to the place it ought to occupy in the country, and open people's eyes to the great possibilities that surround our homes in gleaning the product of the "Honey Bee."

Your committee ask for suggestions to help to make the exhibition popular, but such, to those like myself, who cannot help to carry out any suggestion put forward seems a piece of impertinence. However, I am sure if a fair muster of members are likely to attend the Show, it would be fine to bring them together and discuss matters apianian, and if possible have a few papers read on the subject, which should open up avenues for discussion.

I regret I have no hope of being able to be with you, but none the

less my very best wishes are for the complete success of the undertaking.
—Yours, etc.,

H. MARTIN.

P.S.—I have made an effort to uphold the honour of Natal at this week's Show in Johannesburg by two entries in the "extracted" classes.
—H. M.

VALUE OF EXHIBITING HONEY.

THE following notes are extracted from an article recently appearing from the pen of Mr. D. M. Macdonald, F.E.I.S., who is well known as an up-to-date bee-keeper in Scotland and a constant writer to the *British Bee Journal*.

In no department of bee-keeping does Scotland show off to worse advantage than in this of displaying to the general public the luscious sweets garnered by their bees. The sister countries have any number of county associations under whose auspices apiarian exhibitions are held annually. One or two counties, at the most, in Scotland, hold such displays. At many of our agricultural and horticultural shows small exhibits of one or two classes may be seen in some out-of-the-way corner. This should not be. A honey department should indeed be an adjunct of every flower show. The bees and the flowers are so closely allied, and the one so hangs on the other that where flowers are shown so should their essence, extracted by the bees and manufactured by them into the most delicious sweet bestowed on mankind by a bountiful Providence.

Advantages of Exhibiting.—In itself honey, if tastefully shown, makes up a pleasing and very attractive exhibit. Many who would not otherwise think of purchasing it, or who have been disgusted at the deleterious trash sold at a very low figure and misnamed honey, drawn by the taking appearance of a really fine display, make acquaintance with the genuine article and become regular customers. Nothing tends more to make the apiarist take a pride in his bees than thus publicly exhibiting the finished product, and the resulting emulation does much to encourage all to work towards perfection. The winner determines to keep up his credit, and others make up their minds to beat past records, with the result that both winners and losers turn out neater, tidier and more toothsome products. Officials in charge of these shows should endeavour to work up to a high standard.

Nothing detracts more from the beauty and value of honey than the careless and untidy manner in which it is placed on the market by many small bee-keepers. Here is a means of educating them and giving them a standard to work up to. The neat, clean, tidy manner in

which exhibits must necessarily appear on the show bench if they have any chance of winning a prize provides a model well worthy of imitation. So the benefits and advantages of showing honey are many and of great value to the fraternity, and should be equally so to all lovers of good honey.

Comb Honey.—All sections should be shown glazed, with neatly laced edging, or placed in tasty glazed cartons. Only the best should be shown, and the wood should be as fresh and clean as it is possible to make it. All should conform to the particular class for which the prize is offered. They should be selected with the capping as pure and white as possible, with sealing quite uniform and regular; they should have no travel stains, no thumb marks, and bear no signs of brace combs or propolis.

Extracted Honey.—This class should be shown in pound screw cap bottles, all of uniform size and shape. Uniformity should be insisted on, because these bottles are just as cheap and as easily obtained as the miscellaneous patterns. A high standard should be set for this class of honey, and every exhibit containing small particles of wax, air bubbles, unripe honey or honey not conforming to the class entered for should be penalised. The outsides of packages should be scrupulously clean, with no running honey to daub the fingers. Shallow frames should be free from brace combs, propolis or thumb marks, and smoothness and evenness of finish, allowing of rapid and efficient uncapping, should be a leading feature; all should show the same shade of honey when held up to the light.

Packing for Shows.—Travelling boxes to hold a dozen sections are on the market, and as they are glazed on one or two sides comb honey travels safely, as the contents being seen they receive careful handling. The special boxes for extracted honey have separate compartments for each bottle made of corrugated paper, with a layer of this material above and below. Grocers' empties, however, serve the purpose if the contents are carefully packed and a layer of two or three inches of hay or straw is placed below to make a springy pad or cushion for bottles or sections to rest on. If possible it is important that these should be handled by the exhibitor after unpacking and before they are finally staged.

If the sow is to raise two litters each year, and in addition have a period of rest between the farrowing times in order to renew her strength and flesh and be able to take care of the following litters, she must be well cared for.

The Position of East Coast Fever.

OUTBREAKS DURING MARCH AND APRIL.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 20th March to 21st April:—

Dundee Division.—Outbreaks on the farms “Glencoe Junction” (sub-division of “Burnside”), west of main line, “Springfield” (shown on map as “135”), east of main line.

Weenen Division.—Outbreak on the farm “Exchange.”

Alexandra Division.—Outbreak on the farm “W.S. 21.”

Ladysmith Division.—Outbreaks on the farms “Lichfield,” west of main line, “Putini Spruit,” west of main line.

Utrecht Division.—Outbreaks on the farms “Goedehoop,” “Taamborekshoek” (sub-division of “Wachtenbetjeshoek”), “Bestehoop” (sub-division of “Freschgewagd”).

Krantzkop Division.—Outbreaks on the farms “Klin Nek” (sub-division of “Varken’s Vlei”), “Spitzkop,” “Regina” (sub-division of “Varken’s Vlei”).

Lion’s River Division.—Outbreaks on the farms “Four Oaks” (sub-division of “Stockland”), east of main line, “Portmore” (sub-division of “Middlebosch”), west of main line.

Camperdown Division.—Outbreaks on the farms “Luz,” “Thornton” (sub-division of “Umlaas Poort”), “Grantlight” (sub-division of “Zandfontein” and “Spitzkop”), “Lenensford,” “Powercourt,” “Uitkomst” (sub-division of “Cato Estate”), “Doornrug” (sub-division of “Cato Estate”).

Richmond Division.—Outbreaks on the farms “Insingozi,” “Hella Hella” (Lot W.S. 4), “Process Kraal,” “Haartebestfontein,” sub-division “B” of “Keerom.”

Tropo Division.—Outbreaks on the farms “Rosenthal,” “Eksdale,” “Deasland” (shown on map as Lots 99 and 100), “Lenaville,” “Londsdown,” “Esperanza,” “E.R.,” “H.,” “A.” of “Goodluck,” portion of “Eersteling,” “Ivanhoe,” “A.x,” “A.U.,” “Pendulla,” “Argyle.”

Estcourt Division.—Outbreaks on the farms “Enmadale,” west of main line, “Tabanhllope,” west of main line, “Edenforen,” west of main line, “Ulundi Reserve,” west of main line, “Kelmessan,” west of main line, “Riet Vlei,” west of main line, “Ennerdale,” west of main line,

"Winterton Settlement," west of main line, "Mt. Helena," west of main line, "Calcuta," west of main line, "Wagon Drift" and Town Lands, west of main line.

Bergville Division.—Outbreak on the farm "Peach Trees."

Lower Umzimkulu Division.—Outbreaks on the farms "The Prairie," "Krantzes," "Highland Glen," "Success," "Location No. 5," "Hansen."

Umvoti Division.—Outbreaks on the farms "Greenwich," "Small Hoek," "The Gem" (sub-division of "Rust" and "Groot Reit Vlei"), "Weltevreden" (shown on map as Lot 20), "Groen Kop" (sub-division of "Groen Kop" and "Mistley"), "Clifton" (sub-division of "Vogel Vlei"), "Wintersheek," "On Rust," "Doornberg."

Newcastle Division.—Outbreaks on the farms "Brompton," west of main line, "Waterfall," west of main line

New Hanover Division.—Outbreaks on the farms "Thorpe Lodge" (sub-division eg "Lot 15"), "Green Hill" (sub-division of "Kortkrantz-kloof"), "Waterfall," "Doornkop."

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of the Victoria County, Vryheid, Ngotshe, Babanango, Paulpietersburg, and Umsinga.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

WHERE but few turkeys are kept, they may be housed with other fowls, and receive the same food and care, but are much more liable to disease. In all cases, the floor of the house should be covered six or more inches deep with forest leaves or straw litter, being renewed as often as it is badly soiled and trodden down.—HERBERT MYRICK (*"Turkeys and How to Grow Them"*).

VALUE OF HOLSTEINS.

The man not overburdened with money, who has to be satisfied with breeding milk into his herd, and has a somewhat nondescript lot of stock, of rather mixed breeding and not very satisfactory as milkers, should get a Holstein bull; for this bull's progeny get another Holstein bull. No breed of bull will more quickly put milking quality into the progeny of mongrel cattle than will the Holstein.—R. H. ALEXANDER, Manager, Wollongbar Experiment Farm, N.S.W.

TEMPERATURE OF THE INCUBATOR.

As it is not an easy matter to discriminate between hot and cold weather, the following general rule might be followed with advantage. If the temperature of the room is 40, 50, 60, 70, or 80 degrees, the temperature in the incubator should be adjusted to work at 105, 104, 103, 102, 101½ degrees respectively. The most favourable temperature of the room is between 55 and 65 degrees.—J. H. SUTCLIFFE (*"Artificial Incubation and its Laws"*).

FORCE-PUMPS AND LIFT-PUMPS.

The plunger or force-pump possesses great advantages over the lift-pump in most cases where it can be employed, and is especially suitable where considerable height has to be overcome, or where continuous working is required. It is not suitable in positions where the water is likely to rise above the pump, owing to the difficulty of access to the working parts in case of accident. In deep wells, therefore, the lift-pump with open top is to be recommended for the deep-pumping, and the plunger for subsequently raising the water to the required elevation.—ALLAN GREENWELL, A.M.I.C.E., F.G.S., and W. T. C. CURRY, A.M.I.C.E., F.G.S. (*"Rural Water Supply"*).

VALUE OF CO-OPERATIVE CREDIT.

Co-operative credit has, in a manner, shown itself more effective than capital could have been made under similar circumstances: for, instead of leading to distraint and foreclosure, it has directly prevented such, and made it, not people's interest only, but their recognised aim, to avoid the necessity of seizure. Among poor, struggling people this is something to take credit for. But members have been brought to feel, that it was not their little wealth only, but their reputation, their position among their equals, their future, which were at stake, and the peril of forfeiting them has made them careful.—HENRY WOLFF (*"Co-operative Banking"*).

ALKALI.

Alkali is a natural element of the earth, the same as other minerals. When the rocks on the mountains pulverise and the sediments wash down on the plains, they bring the alkali along and deposit it in the soil. The same alkali salts are formed everywhere in the world, but in countries having abundant rainfall they currently wash through the soil into natural drainage, while in regions where rainfall is deficient the scant moisture carries them down a little way into the soil, from which they

rise to the surface by the evaporation of water, and are thus accumulated at or near the top of the soil. It is right there that nearly all the damage is done.—LUTE WILCOX (*"Irrigation Farming"*).

THE VALUE OF ROTATION.

The universal adoption of rotation has had a very considerable effect on agriculture. It has enabled farmers to have practically the whole of their land under crops at the same time, not lying idle in bare fallow. By increasing the quantity of food produced both for summer and winter, especially the latter, it has given us the opportunity of keeping more stock, and thus producing more meat. It has also increased the amounts of the various crops grown so that we have a higher average produce per acre than any other country in the world. Soil, utility, climate, and the markets must all be considered in deciding what rotation is most suitable. A rotation successful on light land might be impracticable on a heavy one. Clover is one of the crops generally used, and is known as the restorative crop. It is deep rooted, collects food from the heart of the soil, and not only produces good hay, but leaves behind a rich mass of root-lets, leaves, and stems which contain a large quantity of food for the next crop which has been extracted from the air. All plants take some of their food from the air, but clover takes up nitrogen, the chief ingredient of the dearest manures.—PRIMROSE MCCONNELL, B.Sc., in *The Dairy*.

PIG-FEEDING.

The constituents most desirable in feed for swine depend greatly upon the use to which the animal is to put them. A newly born pig's body is largely water, and to grow he must have food that will produce tissue. That is why the milk, primarily designed to furnish proper nourishment for growing animals, needs to be, as it is, so rich in nitrogenous substance. Later, when the time comes that he is intended for quick-fattening, he should naturally be supplied with feed containing much fat-making material, and it is that quality which has given corn [mealies] its high place in finishing hogs for slaughter. It is readily seen, therefore, that different kinds of feed will be needed to furnish the most beneficial results, according to the stage of growth of the animal, the energy required for its maintenance, and the end to which the animal is destined; yet it does not necessarily follow that a ration should be one-sided or be dominated by one element to the exclusion of a variety. Losing sight of this is a mistake that has been made more frequently in the use of corn [mealies] than any other feed; not so much, perhaps, because it is rich in carbonaceous matter, as by reason of its convenience and cheapness in the region where it flourishes.—F. D. COBURN (*"Swine in America"*).

LUCERNE FOR SOIL IMPROVEMENT.

Alfalfa (lucerne) is just as important as an improver of the soil as it is as a hay crop. If the farmers of Idaho realised this and managed their cropping accordingly they would be vastly more prosperous. The difficulty is not that there is not enough alfalfa grown, but that the farmers are loth to plough it up and introduce some rotation. We find that our soils are very well supplied with the mineral elements essential to plant growth, but are deficient in humus and nitrogen. Fortunate it is that these constituents which are lacking can easily be added by growing alfalfa. Such crops as small grain, potatoes, and sugar beets add scarcely any nitrogen; but, on the other hand, draw upon that contained in the soil. Grain stubble and such portions of those crops as become incorporated into the soil supply humus. Since alfalfa is our chief leguminous crop and can supply the nitrogen which ordinary crops do not add to the soil, its great value for soil improvement may be appreciated. Nitrogen is found in abundance in the air, but ordinary crops cannot take it up and utilise it in its gaseous form. The so-called nitrogen-fixing bacteria which are found in the nodules on alfalfa roots take up atmospheric nitrogen and elaborate it into nitrogenous compounds (protein) which are assimilated and stored up in the leaves and stems of the alfalfa plant. It is this protein which makes alfalfa such a valuable forage. The root growth of the plant and the decay and renewal of tubercles on the roots enriches the soil with nitrogen. Leaves dropping off also add some. By ploughing under a crop of alfalfa a still greater amount of nitrogen is added to the soil. In these various ways alfalfa enriches the soil.—*Report of University of Idaho Experiment Station.*

The stallion which does not mark his colts should not be bred to. The stallion is, or should be, the better animal of the two and he should be so prepotent that he is able to impress his superior qualities on the colt. If he fails to do this, he is generally but a very little better than the scrub horse.

A very simple remedy for mange in horses is to wash the animal twice weekly with warm soap suds, then bathe with any disinfectant, such as one part carbolic acid to thirty parts water. Continue this treatment till the trouble is overcome. In washing the animal with soap suds, see that the solution is rubbed into the roots of every hair. This can best be done with a coarse brush.

Correspondence.

** * Correspondence is invited on topics of interest to farmers. Letters should be written on one side of the paper only; and while a nom-de-plume may be used, all letters must be accompanied by the name and address of writer. The Editor is not responsible for the opinions of his correspondents: the letters which appear in these pages are published as the opinions of the respective writers, and their insertion does not necessarily imply editorial concurrence with the views expressed.*

PINEAPPLE ANALYSES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—May I ask you a favour to procure for me a sample or copy of the analyses of the pineapple and the so-called cum cum or gum gum, a yellow berry which the Natives often bring with baskets to town.

Thanking you in anticipation, —Yours, etc.,

Trappist Monastery,

Marianhill, Pinetown.

B. M. MARTIN.

[We have made a search all through our library for the required information, without success. We are instituting inquiries elsewhere, however, and hope to be in a position to reply to our correspondent next month.—Ed.]

UNBURNT v. BURNT LIME.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I would be much obliged if you could advise as to whether limestone, finely ground, but unburnt (as supplied by the Weenen Phosphates Co.) would prove as useful on land, deficient in lime, as burnt lime would be? I know that at Home it is common practice in certain parts to use chalk freely, but am doubtful about the solubility, and consequently value, of the local article.—Yours, etc.,

W. F. B. SUTHERLAND.

Farleigh, Mooi River.

[We referred the foregoing inquiry to the Chemist at the Central Experiment Farm, Cedara (Mr. W. R. Simpson Ladell), who replies as follows:—Unburnt lime is quite as useful as the burnt variety merely for making up a deficiency of lime in a soil, except that the former is not so concentrated. Approximately, 100 lbs. of unburnt must be used to have the same effect as 56 lbs. of the burnt. However, burnt lime has a quicker action, due to its comparative solubility, and is able to mix better with the soil, and when it ultimately goes back into the unburnt condition

it is in the form of a very fine powder which renders it more efficacious than any ground-up variety of unburnt lime.]

LUCERNE TYLENCHUS.

The following letter, which we have received from Mr. C. W. Le May, the well-known London seed merchant, we publish purely as a matter of interest in connection with our recent articles on Lucerne Tylenchus, and without necessarily subscribing to any of the statements contained therein:—

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Referring to the articles recently published respecting the above, it will be interesting to everyone connected with this most valuable plant to know that there need be no fear of Tylenchus Devastatrix or dodder in lucerne seed if buyers will only take precaution to get the best thoroughly cleaned seed.

The cause of bad, dirty crops, and failure of crops is because dealers are tempted on account of a few shillings per cwt. to buy seed that has not been properly cleaned.

For many years I have tried to introduce a higher standard of lucerne seed for South Africa, and have shipped a considerable quantity of London re-cleaned lucerne seed without receiving a single complaint.

It is generally agreed that the seed produced in the Provence district gives the best results, though large quantities of Turkestan and other kinds are being used.

In addition to sifting the best seed obtainable, and blowing out light, immature grains, the cleaned seed is again cleaned by a special machine, which removes all rough skinned seeds, such as dodder, docks, etc., usually found in lucerne, also all dirt. This latter is most important, as out of several samples which were submitted to the following Analysts, the only case in which Tylenchus Devastatrix was discovered was one specimen which Mr. Carruthers found on a particle of earth in a sample of the seed as imported:—

Dr. Stebler, of the Seed Testing Station at Zurich.

Professor Biffen, of Cambridge University.

Mr. Wm. Carruthers, Consulting Botanist to the Royal Agricultural Society of England.

Mr. D. Finlayson, of the Seed Testing Stations, Wood Green London, N.

I have also consulted the following well-known seed merchants who have a practical, as well as a theoretical, knowledge of such matters.

Messrs. Sutton & Sons, of Reading, state that as regards all the many hundreds of tons of lucerne seed which they have sold they never heard

of a single instance in which *Tylenchus Devastatrix* has been discovered in their seed, and that they attribute the fact not only to their seed being grown in healthy districts, but to their use of a triple process of cleaning, which would certainly eliminate *Tylenchus* were it through any unforeseen circumstance present. Messrs. Sutton strongly urge that no seed, however free from *Tylenchus*, should be sown on infected land, and in this view they have the support of the most eminent analytical botanists of the day.

Messrs. James Carter & Co., of London, write:—"We have never found a trace of *Tylenchus Devastatrix* in any of the lucerne seed that we have sent out: we are confident that none could be in our seed after it has been cleaned by us. We consider Provence lucerne the best kind to sow, and we always supply this variety unless otherwise specially ordered."

For my own satisfaction, whilst making these enquiries I submitted sets of samples to two of the Analysts, with the following result:—

PROVENCE SEED.

<i>As Imported.</i>			<i>First Cleaning.</i>			<i>Re-cleaned.</i>		
Pur. %	Ger. %	Weight per 1,000 grains.	Pur. %	Ger. %	Weight per 1,000 grains.	Pur. %	Ger. %	Weight per 1,000 grains.
96.7	86	1.602 grms.	98.2	92	1.993 grms.	99	89	2.030 grms.
98.84	95	1.925 "	99.22	92	2.011 "	99.44	94	2.102 "

TURKESTAN SEED.

<i>As Imported.</i>			<i>First Cleaning.</i>			<i>Re-cleaned.</i>		
Pur. %	Ger. %	Weight per 1,000 grains.	Pur. %	Ger. %	Weight per 1,000 grains.	Pur. %	Ger. %	Weight per 1,000 grains.
98.9	96	1.773 grms.	99.5	95	1.782 grms.	99.3	96	1.808 grms.
98.98	97	1.771 "	99.54	98	1.785 "	99.7	99	1.805 "

The first-mentioned test is by Dr. Stebler, the latter by Mr. D. Finlayson.

This season I intend making several ground trials of the above, and shall be pleased to let anyone know the result and to give any further information in my power.

In conclusion, I think the South African Governments should make it illegal to sell to farmers Provence lucerne seed under the standard of 99 per cent. purity, 90 per cent. growth, weight not less than 2.00 grams per 1,000 grains; for Turkestan 99 per cent. purity, growth 90 per cent., weight per 1,000 grains not less than 1.80 grams, and establish a properly equipped Government seed testing station, with a few inspectors to take samples from farmers, country dealers, etc. If this were done it should be of inestimable advantage to South Africa.

Some such arrangement already exists in several countries, and is responsible for the greatest benefit.

Apologising for trespassing on your space at such length,—I remain, yours, etc.,

C. W. LE MAY.

THE FARMER BOYS' PAGES.

MONTHLY ARTICLES, NOTES AND PARAGRAPHS ON
ELEMENTARY AGRICULTURAL SUBJECTS

FOR

BEGINNERS IN AGRICULTURE AND STUDENTS GENERALLY.

Conducted by "ARATOR."

** * Correspondence, whether in the form of notes, comments, or inquiries, is invited from readers, and letters of general interest will be published and replied to in these pages. All communications should be addressed to "ARATOR," C.O. Editor, "Natal Agricultural Journal," Maritzburg.*

"Arator" to His Friends.

LAST month the usual instalment of these PAGES was "crowded out," the Editor of the Journal not being able to spare room for them owing to pressure of other and more important matter. In the meantime I have been able to secure the first instalment of a series of simple articles of Fruit Culture, specially written for these PAGES; and I recommend all interested in this important subject to follow the articles closely. "Pomus" has promised to do his best to make the articles as clear as possible, but if there should be any points which any readers do not understand, the writer will be glad to answer them and endeavour to clear up any little difficulties. We have in this month's PAGES, also, the second article of the "Principles of Manuring" series, which I hope readers will find useful. And, of course, there is the usual Chemistry article.

* * *

I have received two or three inquiries from readers which require attention; and I will now deal with them. Mr. C. W. Martin, of Tugela Station, writes as follows:—"I have before me two letters from merchants endeavouring to explain to a neighbour how it is that check row planting is made use of so little by the Natal farmer. These letters were in answer to an enquiry addressed to the merchants, and, of course, put the matter from their point of view, which really is not quite satisfactory, and my friend and myself think we would like to have the farmer's

reason for not using a machine which seems such a tremendous labour-saver by doing away with hand cultivation entirely. Is it that it is more trouble? or, that the farmer needs educating up to the machine?

* * *

"I have never seen a machine in use," Mr. Martin proceeds, "but have seen one or two check rows lying indiscriminately about the veld, and I should come to the conclusion that the machine was not satisfactory were it not that I understand that practically the entire American crop is planted in this manner. I would be grateful if you could inform me why up-to-date farmers such as are to be found growing mealies in the Manderston-Camperdown district do not make use of this attachment. We want to plant next year on this plan to avoid being dependant on hand labour, having had difficulty in obtaining sufficient to clean even once." My idea of the matter has always been that our farmers have considered the use of the check-row system of mealie-planting too much trouble—or, at best, more bother than it is worth. However, I thought I would get the views of the Farm Manager at Cedara (Mr. Alex. Reid) also on the question; and he has kindly favoured me with the following reply, which bears out my own opinion. He says:—"Why check-row planting of mealies is so seldom seen in Natal can only be accounted for simply because it may entail a little more attention, perhaps, in making a start and attending to moving the stakes at either end of the field. It certainly takes more time in the planting throughout, which, however, I consider is well warranted.

* * *

"The system is strongly recommended," Mr. Reid goes on to say, "because the crop can be cultivated in so many directions with scufflers that hand hoeing is unnecessary. I notice there are check-rowed fields in the Camperdown district this season, and the whole crop at Cedara is check-rowed. A practical demonstration on the system was given at Cedara a few months ago by a representative of the American Moline Plow Coy. (Mr. Moore)."

* * *

Another correspondent has asked me the best method of quickly testing a soil for lime. The Chemist at Cedara tells me that the best method is that recommended by Bernard Dyer. The soil must first be dried and powdered, and if it contains much organic matter two ounces are taken, placed on an iron shovel, an heated in the fire at a low redness until all the organic matter is burnt away; in most cases the soil will now be quite red in colour, due to quantity of iron usually present in Natal soils. The ashes are placed in a glass with enough water to make them into a thin paste, and stirred with a wooden penholder until all bubbles of air are driven off. Two ounces (a tenth of a pint)

of hydrochloric acid (spirits of salt) are added and the mixture well stirred. If a brisk effervescence takes place the soil contains a sufficiency of lime, if the effervescence is very slight or none at all the soil is very poor in lime. As a rule, if there is any doubt at all as to the result of the experiment, the soil is poor in lime.

Fruit Culture.

SOME CHATS FOR BEGINNERS.

By "POMUS."

BEFORE we take up the study of fruit culture proper a little preliminary consideration of the principles which govern growth in the vegetable kingdom will enable the reader to grasp more easily the more difficult points in our main study.

Plants are primarily produced from seeds. All the energies of the parent plant are devoted to the production of seed to enable the species to persist; and with the parting of the seed from the parent plant we have the first step in the life—if it may yet be called a life—of a new individual. In order that that seed may germinate—that is to say, resolve itself into a tiny plant—certain conditions are necessary. The seed must have heat, it must have moisture, and it must have air; but it does not require light as the plant itself does later on. These three essentials of sufficient heat, sufficient moisture, and sufficient air, are to be found near the surface of moist, warm, mellow earth. Heat is necessary, as I have said, for all seeds in their germination, but the requirements of the different species vary, some requiring a greater degree of heat than others. As regards moisture, every one is acquainted with the necessity for this condition. Here again, however, the amount of moisture available must not, on the one hand, be too little—or the seed cannot germinate—nor on the other hand be too great—which, besides reducing the temperature of the soil, would exclude air, which is the third requisite for germination. This last requisite is, in fact, of great importance, and whilst seeds must be buried sufficiently deep to obviate any chance of their drying out through being too near the surface, at the same time they must not be planted too deeply, as sufficient air will not reach them. (Since I have referred to the necessity of burying seeds sufficiently deeply to ensure their being kept moist, I may as well state here that certain very small seeds can and in some cases must be buried near the

surface of the soil; in such cases, if the weather is too dry the beds must be shaded from the hot rays of the sun; otherwise damp weather must be chosen. I have myself obtained a good stand of lucerne—the seed of which is very small—by sowing on the surface in damp weather and not covering the seed.)

The living matter of all plants is built up of tiny cells, and growth takes its place by the expansion up to a certain point, followed by subdivision, of these cells. To show how tiny these cells are it may be said that the branch of an apple tree merely an inch in diameter will show about one million of these cells if it is cut across.

A tree consists of roots, stems, and branches. The roots consist of a tap root and many roots branching therefrom. These smaller roots are called laterals. Smaller than the laterals are the tiny fibres or rootlets proceeding from them; whilst smaller still are the minute root-hairs which are attached to the newer fibres. These root-hairs are so fine that they can hardly be seen without the aid of the microscope. The roots absorb moisture from the soil, in which are dissolved the substances required by the plant in its growth. All parts of the root, except the very old ones which are covered with a hard "bark," absorb moisture thus, but the newest roots absorb it more freely than do the older ones.

The point of union between the root of the tree and the stem is called the "collar."

The stems of trees consist of bark, cambium, wood, and pith, in the order in which I have named them. The cambium is the active growing part of the tree. It comes between the bark and the wood. On its inner surface (that is against the wood) it forms fresh wood, whilst on its outer surface, against the bark, it forms new bark. The inner layer of bark next to the cambium is known as "bast." That portion of the wood which is nearest the cambium is known as the sap-wood, being the youngest and freshest, whilst the wood near the centre of the tree is called the heart wood, and is the oldest.

There are two kinds of buds, *viz.*, leaf-buds and flower buds. Leaf-buds produce shoots which eventually become branches, whilst from the flower buds fruit is formed. The fruit of a tree can be increased by a pruning away a portion of the leaf buds; whilst on the other hand if it is desired to restrict bearing a number of the fruit buds can be removed. "Terminal" buds are those which grow at the end of a shoot; whilst the buds which are produced along the side of a shoot are known as lateral. The terminal buds are much stronger and larger than the lateral, and consequently make stronger shoots. The leaves of the tree serve as lungs; they breathe in the air and throw off vapour and gases.

(To be continued.)

Agricultural Chemistry for Beginners.

CHAPTER VII.

BY ARCHIBALD PEARCE.

ORGANIC MATTER AND CARBON.

If we examine a portion of any living thing, whether plant or animal, it will be noticed to consist of various well-defined parts such as tubes, hairs, membranes, etc., to which the name of *organs* is given; and matter in this, which may be considered its highest form is said to be *organised*. But organised matter is composed of various compounds; and to these substances, the materials of which organised matter is built up, the term *organic matter* is applied. At one time it was believed that no organic compounds could possibly be obtained without the agency of life in some form or other, and so a sharp line of distinction was drawn between organic and inorganic or mineral matter; but of late years it has been discovered that many organic compounds can be built up from inorganic materials, and so the dividing line is not very definite. But still the term is practically a very convenient one; and the chemist understands that in speaking of organic substances he is referring to such chemical compounds as are derived from animal or vegetable matter, even if in any special case they happen to have been artificially produced from inorganic sources. There is this restriction which must be placed upon the preceding definition, namely, that all organic substances are compounds of the element carbon. This limitation is best illustrated by an example. We have learnt that when nitrogenous animal or vegetable matter—we will now call it nitrogenous organic matter—decays, one of the products formed is always ammonia, and it might be thought that this ought to be classed as an organic compound; but the original matter contained no ammonia as such, and it was only produced owing to the processes of decay causing the original compounds to rearrange their elements and form new combinations. Organic matter, then, may be defined as the carbon compounds which are found in animal or vegetable structures or are derived from those structures. The number of these compounds is legion; in fact they far outnumber all the compounds of other elements put together, and some of them are of very complicated construction. The chief elements that go to the formation of these organic compounds with carbon are oxygen, hydrogen, nitrogen, and in a less degree, phosphorous and sulphur. Organic matter, if heated in the air, first blackens, owing to the separation of carbon; and if the heat be increased, and the supply of oxygen kept up, it is gradu-

ally converted into various gaseous compounds, which disappear in the form of smoke, etc. We are all familiar with the result of burning organic matter such as wood; the organic portion is entirely burnt away, as we say, and only a small residue of mineral matter is left, which we call ash.

CARBON.

No one, on a casual inspection, would be likely to imagine that a diamond, the lead from a pencil, and a piece of charcoal were identically the same substance; and yet such is the fact, all three being different forms of the element carbon. The diamond is crystallised, or has a definite geometrical shape; the others are amorphous, or without crystalline form. It is true that charcoal is not quite pure carbon, containing, as it does, a small quantity of mineral ash; but this in no way alters its appearance, as may be seen by charring a piece of pure sugar, when pure carbon remains.

CARBONIC ACID.

When carbon is burned, it unites with the oxygen of the air, forming the well-known carbonic acid gas, properly called carbon di-oxide, as it contains two parts of oxygen. This is an acid oxide, combining with water to form carbonic acid, which is, however, so unstable a substance that it breaks up again into water and the di-oxide on the smallest provocation. The combustion of any organic substance produces carbon di-oxide; hence wood or coal fires give off large volumes of this gas. It is also produced during the respiration of animals by an exactly similar process; the worn-out and dead particles of the body are brought into close contact with the air in the lungs, and are burnt up by a slow process of combustion, the heat produced being the cause of the warmth of the living body. The decay of organic matter in the soil also produces quantities of carbon di-oxide, and the fermentation of sugar is another source of the gas. Fermentation is a process due to a low form of fungus, which converts sugar, whether ordinary cane sugar or that found in fruit and malt, into alcohol and carbon di-oxide. Since the presence of this gas in any quantity renders air unfit for breathing, we can now understand the necessity for free ventilation. With all these sources continually in action, we might expect that the atmosphere would soon become too full of the gas to support life, and this would doubtless be the case but for a kindly provision of nature whereby the balance is kept up. We have seen that plants consist largely of carbon, and this they obtain from the air by the action of their green parts, chiefly the leaves. Under the influence of sunlight, these have the power of absorbing the carbon di-oxide, separating the carbon for their own growth, and sending out the oxygen again, thus breathing in exactly the opposite manner to animals. In this way the air always keeps the same composi-

tion. It is easy to arrange a beautiful experiment to illustrate this process. Take a bunch of fresh, green leaves of any succulent plant, water-cress is as good as any, put them in a bottle, and fill it up with fresh spring water so that no air is left. The bottle must then be turned upside down with its mouth under water in a saucer, which may be done by plunging bottle, saucer, and all under the surface of the water in a bucket, and lifting all out together. Then stand the whole arrangement in the sun, and in a few hours we shall notice numerous bubbles of oxygen gas clinging to the leaves or perhaps collecting at the top. Spring water always contains carbonic acid, and the leaves have been decomposing it in the manner described. Rain water also naturally contains carbonic acid, which though not very powerful as acids go, yet exerts considerable influence in dissolving many substances in the soil, and so rendering them fit for the use of plants.

CARBONATES.

Like other acids, carbonic acid forms salts called carbonates, those of calcium, potassium, sodium, and ammonia being the most important. Being so weak an acid, it is easily expelled from its salts by almost any other acid. If a little washing soda (sodium carbonate) be placed at the bottom of a glass, and a little acid of any kind, even vinegar, be poured on it, an effervescence will immediately commence, due to the escape of the di-oxide. If the glass is covered with a sheet of paper, it will soon be filled with the gas; then put a lighted match inside, and see how suddenly it is extinguished, for the flame, like an animal, lives on oxygen, and dies in its absence. There is a very easy and instructive test for the presence of carbon di-oxide, for it readily combines with lime, forming the insoluble carbonate of calcium. If a teaspoonful of lime is put into a bottle of water, well shaken up, and allowed to stand till clear, we get a solution of lime called lime-water. Put a little of this into a glass, and breathe into it through a tube of any kind for a minute; you will see it turn quite thick and milky, and if left to stand for a few minutes a quantity of white powder will settle at the bottom, which is chalk or calcium carbonate. If lime water is allowed to remain uncovered in the air it soon gets coated with a film of the same carbonate, owing to the action of the carbon di-oxide in the air.

QUESTIONS.

- (1) Why are coals called "black diamonds?"
- (2) Define the meaning of organic matter. Which of the following substances are organic and which inorganic:—Clay, cotton, leather, glass, sugar, water?
- (3) Why is ventilation necessary in a room with people in it?
- (4) Explain the difference between the respiration of animals and plants?

- (5) What happens if you pour hydrochloric acid on washing soda?
- (6) How can you prove that your breath contains carbon di-oxide?
- (7) What is chalk? Could you distinguish by a chemical test whether an unknown white substance was chalk or not?
- (8) How is the carbonic acid in the rain useful to the farmer?

The Principles of Manuring.

II.—NITROGEN.

WE have seen, in our last article, that among the various substances which are used by plants in their growth, the most important—in fact the ones that are absolutely essential to the plant—are nitrogen, phosphoric acid and potash. As was remarked in that article, “the business of the practical farmer, so far as manuring is concerned, is to see that these three substances in particular are present in the soil in such proportion and to such an extent as the particular crop he is growing is concerned.” It will accordingly be convenient to take each of the substances in turn and consider its position in agriculture.

NITROGEN.

Whilst nitrogen, phosphoric acid and potash are the most important of the many substances which are found in plants, nitrogen again is the most important of these three substances themselves. Indeed, to a very large extent the fertility of the soil depends upon the presence and character of the nitrogen it contains. Nitrogen goes to build up leaf and stalk, and consequently the more of this substance that a soil contains the heavier will be the growth of leaf and stalk.

Nitrogen occurs in greater abundance in a “free” condition in the air; in fact, about 80 per cent. of the nitrogen in the world is to be found in the atmosphere. In one way and another the atmospheric stores of nitrogen are drawn upon and this free nitrogen is the original source of all other forms of the substance. At the same time, practically speaking, this large store of free nitrogen is not available for use by plant life. There is an exception, however, to be made in the case of legumes, a certain type of plant life to which further reference will be made later on. While (so far as is yet known) all other plants have to depend upon the changes necessary in free nitrogen to be made by factors outside of themselves, these changes are in the case of the legumes effected by means of micro-organisms which live on the roots of these plants and convert the nitrogen which they obtain from the air into a form in which it can be made use of by the roots of the plant. Peas, beans and earthnuts (or

monkey nuts, as they are called locally) are examples of leguminous plants; and if any of these plants are pulled up whilst growing they will be found to have on their roots little knots or nodules, in some cases the size of a small pea, in other cases as small as a pin's head. These nodules are formed by the colonies of bacteria which are producing the changes in the nitrogen they extract from the air necessary to render it available for use by the plant on which they live.

All soils which can lay any claim to the term soils contain nitrogen, in either an available or a non-available form or in both forms. A soil which contains a considerable amount of nitrogen in a non-available form, but which contains only a small amount in an available form, may be spoken of as fertile, because most of the nitrogen which it contains is in a form which renders its immediate use by crops impossible. Such a soil does not necessarily need manuring, although it may do so for the forthcoming season as a temporary measure; what it requires in order to render it more fertile—in other words, to convert the non-available nitrogen into an available form—is ploughing, and generally, as frequent cultivation, in one form and another, as possible. This tillage process has the effect of increasing the stores of available nitrogen (by which is meant nitrogen which can be made immediate use of by crops).

Some soils, as has been said, contain more nitrogen than others. Peat soils are the richest of all in this substance; at the other end of the scale are marls and sandy soils, which are the poorest.

(To be continued.)

Tests for Students.

SOME USEFUL QUESTIONS AND ANSWERS.

Following is a further instalment of the questions and answers begun in the January number:—

TEXTURE.

Question 1.—What do we mean by the “texture” of the soil?

Answer. By texture we mean the physical state or condition of the soil, such as mellow, hard, loose, compact, porous, shallow, deep, lumpy, coarse, or fine.

Question 2.—What is a “mellow” soil?

Answer. A mellow soil is a soil having a good texture, or one that is easily worked.

Question 3.—Why is good texture important?

Answer. Good texture is important because on such a soil we get larger crops than on a soil of poor texture. In a soil that is mellow, or of good texture the plant food is more available for the reason that such a soil holds a large amount of moisture and air and allows the free passage of the roots of plants. A mellow soil also allows a better root hold to the plant, and furnishes a comfortable place in which the plants may grow.

Question 4.—How is good texture obtained?

Answer. Good texture is obtained in two ways (a) by tillage or cultivation; (b) by adding some material to the soil.

Question 5.—How does tillage improve the texture of the soil?

Answer. Tillage improves the texture of the soil by breaking up and loosening it, so that air and moisture can enter, and the roots of plants can move freely in the soil.

Question 6.—What materials do we add to the soil to improve its texture?

Answer. Most fertilisers not only furnish plant food, but also improve the texture of the soil. Lime is often used on clay lands to make them mellow. Farm manures are usually more important in improving soil texture than in directly supplying plant food.

Question 7.—What is the first thing to do to a soil?

Answer. The first thing to do to a soil is to improve its condition, or texture, by careful and thorough tillage. After the soil has been put in good condition, plant food may be supplied if it is needed. A hard, lumpy soil will not produce good crops, no matter how much plant food it may contain.

Dairy Notes.

Impure water will spoil the flavour of the best butter.

Milk out the last drop—that contains the most butter-fat.

Bean meal and cotton cake are excellent foods for making rich milk.

Treat your cows kindly; it always pays in the end.

Do not keep fish or onions in your dairy; these would give bad taints to the milk, cream, or butter.

For winter churning 58 deg. to 62 deg. will be a suitable temperature for cream.

Whole or "loppered" milk requires a higher temperature for churning—62 deg. to 64 deg. Fahr.

Few dairymen fully appreciate the relation of comfort of the cows to his cash returns. The dairy cow is a good machine, but she is very particular as to how she is run. A soft, clean bed and a nutritious cud are essential requisities to winter contentment.

Teaching Calves to Eat.

THE calf is easily taught to eat solid food by placing a small quantity of meal in its mouth, and after the calf is eating unaided do not allow its food to remain to become sour, but begin with a small quantity and increase gradually as the appetite of the animal demands it. The same rule should be followed in feeding hay, and increase with the growth of the calf.

The dairy calf should be fed with a view of securing rapid growth, without a tendency to become fat, and for this reason feeds too rich in fat and carbo-hydrates should be avoided. Protein is the element needed.

Successful dairy calf development requires regular feeding: the milk should be warmed to blood heat; the food and water must be pure and clean, and the calves kept contented and comfortable.

Poultry Notes.

A NEST-EGG makes the nest more attractive to most hens, especially of the smaller breeds.

Generally when a fowl has a bad case of roup it is better to kill it, unless the bird is especially valuable.

To ensure eggs containing the greatest strength and vitality, it is best to keep the males with the hens as long as the eggs are being saved for hatching.

Eggs from year-old hens will produce stronger and more robust chicks from early hatches than will eggs from pullets, because the pullet is not fully developed until it is a year old.

The utmost care and skill must be used when making up the season's breeding pens, for it is at this time that the year's success or failure is determined. Start right; follow the advice of those who know, attend strictly to business, breed the best general purpose fowl in existence, and your success is assured.

Sell the surplus cockerels. You cannot afford to keep them in summer "simply for the sake of their society," as the price generally decreases with the added age and weight of the bird. Some have found it profitable to convert the cockerels of the heavy breeds into capons.

Hints on Sowing Seeds.

LARGE seeds, such as peas, beans, beetroot, etc., should be sown about 2 inches deep. Small seeds, especially some very small ones, require very shallow sowing, and the greatest care should be taken in regard to this in order to ensure successful results.

The seed-bed should be protected from heavy rains and from direct sunshine.

A sprinkling of wood ashes over the newly-appeared seedlings is useful both as a stimulant and as a protection from insects, but soot, where obtainable is better.

The soil should be fairly firm and consolidated, especially in the case of small seeds. The soil should in all cases be thoroughly well prepared, and should be generally of a loamy nature, with a good proportion of manure and sand, and should be brought to a fine tilth. This can be made firm without the risk of surface baking, and the young rootlets are quickly able to get hold of the soil.

After the seeds have been carefully and thinly sown they should be lightly covered with fine earth, and a final light pressure should then be given.—(*Cyprus Journal*.)

Balanced Ration for Horse.

WHAT should we feed our horses? The list of feeding stuffs is large; one can at all times choose the best and cheapest, also have a number of different feeds each day, making a balanced ration also pleasing to the horse.

The following are some feeds:—Dried brewers' grain ranks first, not speaking of maize and oats, which are well understood; oats feed, wheat bran, ground rye, ground barley, cottonseed meal in small quantities; wheat is also good, equal to corn. Now, in making a balanced ration for a horse, one must classify the work to be performed by the horse—light, medium, hard.

The next thing to consider is how much nutriment is necessary to maintain a 1,000 lb. horse at rest? It takes 20 lb. of dry matter or bulk to satisfy the horse's hunger; 8 lb. or 9 lb. of that must be digestible nutrients.

In writing of a ration it means for 24 hours. The digestible nutrients are protein, or muscle-forming food; carbohydrates, or fat-forming food; and ether extract, or the plant oils, which perform the same office as carbohydrates, only it takes $2\frac{1}{2}$ lb. of ether extract to equal 1 lb. of carbohydrates. The horse requires 1 lb. of protein, 9 lb. of carbohydrates, 3-10ths lb. of ether extract.—(*Agricultural Gazette*, London.)

Meteorological Returns.

Meteorological Observations taken at the Govt. Stations for the Month of March, 1910.

STATIONS	TEMPERATURE (Fahr. Deg.)				RAINFALL (In Inches)						
	Means for Month		Maximum for Month	Minimum for Month	Total for Month	No of Days	Heaviest rainfall in 1 day.		Total for Year from July 1 1909	Total for same period from July 1 1908	
	Maximum	Minimum					Fall	Day			
Observatory	81.1	66.7	89.1	63.0	11.95	12	3.05	27th	41.37		
Stanger	83.6	65.4	94	60	2.34	9	.85	17th	39.35		
Verulam	86.6	65.0	82	61	4.76	13	1.12	27th	30.18		
Greytown	85.6	51.9	91	45	2.31	11	.65	3rd	30.63		
Newcastle	86.7	45.0	93	38	5.02		1.45	6th	30.88		
Lidgerton	80.0	48.7	90	41	6.32	16	2.76	18th	38.14		
Estcourt	81.1	57.1	90	51	4.22	8	1.55	28th	27.70		
Umbogintwini	81.6	64.0	87	60	10.62	15	5.40	27th	12.27		
Mid-Illovo	78.9	58.7	89	41	6.74	14	2.19	18th	59.58		
Port Shepstone	85.2	64.8	85	61	8.99	13	2.65	27th	37.55		
Umzinto	78.1	56.0	83	54	11.17	12	1.62	20th	38.98		
Richmond	77.5	57.3	89	44	6.74	14	2.19	18th	39.58		
Maritzburg	79.9	59.2	91	51	5.63	13	1.91	16th	34.54		
Howick	79.7	58.9	88	48	4.52	11	1.63	18th	30.06		
Ladysmith	84.9	58.9	95	51	2.93	9	1.21	3rd	26.72		
Dundee	83.6	58.9	90	11	3.17	5	1.60	3rd	26.99		
Weenen Gaol	91.3	56.8	99	51	3.20	8	1.35	27th	25.12		
Krantzkloof	78.9	62.2	90	57	6.30	11	2.21	19th	37.10		
Camperdown	—	—	—	—	2.55	—	—	—	22.60		
New Hanover	86.5	57.9	93	51	6.28	11	2.35	18th	40.57		
Krantzkop	81.7	58.0	86	50	1.92	6	1.18	3rd	35.07		
Nqutu	79.5	51.5	86	45	1.02	7	.31	4th	—		
Utrecht	81.6	51.3	89	46	4.15	7	1.00	5th	25.67		
Ngomi Forest	73.7	56.7	83	49	4.94	22	.97	11th	64.97		
Empangeni	81.9	61.2	93	60	3.92	12	1.62	11th	45.53		
Mtunzini	83.4	54.6	92	51	6.75	8	2.18	10th	68.90		
Umbombo	76.3	62.1	84	51	3.71	9	1.02	7th	18.86		
Point	—	—	—	—	12.22	12	4.40	20th	14.93		
Nottingham Road	74.2	50.3	84	40	1.98	15	1.69	18th	28.40		
Charlestown	74.5	50.2	83	39	6.78	8	2.83	3rd	31.49		
Bulwer	—	—	—	—	4.88	20	1.36	23rd	43.65		
Ixopo	—	—	—	—	6.10	12	1.72	28th	22.57		

Meteorological Observations taken at Private Stations for the Month of March, 1910.

STATIONS	TEMPERATURE (In Fahr. Degs.)		RAINFALL (In Inches)						
	Maximum for Month	Minimum for Month	Total for Month	No. of Days	Heaviest rainfall in 1 day		Total for Year from July 1, 1909	Total for same period from July 1, 1908	
					Fall	Day			
Hilton ..	85	50	3.79	17	1.24	18th	33.65	37.80	
P.M.B. Botanical Gardens ..	92	51	3.69	12	1.13	18th	30.99	33.42	
Ottawa ..	—	—	4.36	10	1.25	18th	30.95	29.94	
Mount Edgecombe ..	—	—	6.03	11	1.52	18th	37.51	—	
Umzinto, Beneva ..	—	—	10.16	12	4.35	26th	37.83	34.5	
Reit Vlei ..	—	—	3.66	13	1.17	26th	24.32	28.69	
Cedara—Hill Station ..	88	51	4.38	31	1.55	1st Ap	—	29.18	
Cedara—Vlei Station ..	84	44	4.79	22	1.32	19th	—	27.27	
Winkel Spruit ..	86	50	9.98	10	4.38	26th	38.18	34.09	
Weenen ..	91.5	38.5	3.05	7	1.26	27th	23.85	—	
Giant's Castle ..	72.6	51.9	5.99	19	1.28	6th	40.10	44.94	
Umhlangeni ..	—	—	14.06	13	5.97	27th	45.61	—	

Return of Farms at Present under Licence for Lung-sickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw	Ladysmith	Scab	Natives	Roosboom
		"	Natives	Roospoort
		"	H. Coombs	K. einf. stein
		"	J. Brandon	Jackal spruit
		"	J. Farquhar	Stewart Park
A. B. Koe	Portion of Estcourt	"	R. Mattison	Calcott
		"	W. Crouch	Onkha apton
		"	H. Hatting	Drieo stein
		"	C. Hatting	Doons p
		"	J. Ralfe	Frere
		"	C. Labuschagne	Haas o stein
A. C. Williams	Utrecht	"	G. J. Mohl	Wilgeboschspruit
		"	D. Pfaff	Groen Vlei
		"	P. Allen	Schurweklip
		"	G. H. Davel	Klipfontein
		"	J. D. Davel	Skuinshoek
		"	H. A. Davel	Klipfontein
		"	P. P. de Jager	Waterval
		"	W. Steenkamp	Hoekkrantz
		"	A. T. Davel	Klipfontein
		"	C. Combrink	Waterval
		"	J. D. van Coller	Klipfontein
		"	Natives	Goedehoop
		"	T. Botha	Utrecht
L. Trenor	Aifred	Lungsickness	J. T. Cloutier	Whiteliff
		"	Natives	Location No. 2
R. Wingfield Stratford	Newcastle	Scab		
L. G. Wingfield	Newcastle	Lungsickness	C. Kemp	Highton
Stratford		Scab	J. Gibsen	G. dermanagh
		"	P. de Wet	Fra. z. Hoea
		"	Natives	Tiger Kop
		"	Messrs. Reynolds	
		"	and Harvey	Rh. ehok Vlei
		"	R. S. Muller	Groot. lip
		"	T. Lazenby	Spi. glock
		"	Natives	Caven
		"	M. Woithe	Byron
		"	J. Donovan	Wis chope
		"	R. D. Barry	Aliced. e
		"	J. Watt	Lon bardy
		"	J. Dick	Bernard
		"	J. Joubert	Frantzhoek
G. Daniell	Vryheid	"	Natives	Leus. wonden
		"	J. P. van Rooyen	Weltevreden
		"	Natives	Scheeperslaagte
		"	D. de Bruyn	Vaalkop
		"	H. W. Schultz	Uitzicht
		"	H. Shippey	
		"	Mrs. Webb	Rensburg
		"	R. P. van Rooyen	Br. skloot
		"	Natives	Mademoiselle
		"	J. H. Kay	vergenseg
J. B. Cooper	Nkandha & Ngutu	"	H. J. du Preez	Good Hope
		"	J. G. du Preez	
		"	J. G. du Preez	Lakochel e
		"	Natives	Dalala
		"	"	Nawgurtomus
		"	"	Telesi Hill
E. Varty	Western Umvoti	"	F. R. Nel	Vernaak's Kraal
		"	J. A. Graham	Driefontein
		"	Natives	Waterfall
		"	P. M. Van Rooyen	ampoem Nek
R. Mayne	Eastern Umvoti	"	L. van Rooye	Krantzkop
		"	Natives	Ela. ds Vlei
		"	Van Rooven Bros.	Wonderfontein
		"	L. M. J. Van Rooyen	Sweethome
	Krantzkop	"	D. Havemann	Umvoti Po. rt
A. H. Ball	Weenen	"	P. P. van Rooyen	Doornkloof
		"	Nauke & Lotter	Scottshoek
		"	J. T. van Rooyen	Belle Vue
R. J. Marshall	Dundee	"	Harvey & Retallack	Sterkstroom
		"	A. Jansen	Sheepridge
		"	E. G. Wohltz	Stille Rust

RETURN OF FARMS UNDER LICENCE—*continued.*

STOCK INSPECTOR	DISTRICT	DISEASE	OWNER	FARM
J. F. van Rensburg	Ngotshe ..	Scab	J. C. J. Liversage .. Mrs. S. Vermaak .. C. J. Vermaak ..	Tovernaarsrust Friskewacht
E. W. Larkan ..	Umsinga ..	"	J. Collie .. S. J. Kem ..	Goudhoek Ulthoek
K. Ripley ..	Emtonjaneni ..	"	L. E. O. Du Bois .. Natives ..	Balgowan.e Crown Lands, Beyela.
		"	" ..	Protest
		"	" ..	Elizabeth
		"	H. Saunders ..	Viakbult
C. E. Walker ..	Portion of Estcourt	"	Natives .. A. F. Heenderso ..	Rustverwacht Milbrake Fell
H. Va . . . ooyen ..	Babango ..	"	P. Male .. J. G. J. Blanche .. L. Potgieter ..	Sanham Vrsgewacht labatlof

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :—

ON THE 11TH MAY.

Solferino (Gourton)—Dark bay entire, blind on off-side eye; probable value, £10. Impounded on 31st March by Mr. M. Hattingh, "Amatamo."

ON THE 18TH MAY.

Dundee—Six Merino ewes, swallow tail, tip right ear, swallow tail tip left ear, half moon front left ear, one ewe indistinctly branded right side, looks like M.

Hope Farm (Newcastle)—(1) Two Merino ewes, with lambs, branded T.O.; (2) Merino ewe, branded T.O.

Mapumulo—(1) Black ewe goat, five small nicks front of left ear, about four years old, no other marks; (2) black ewe goat, about two years old, no marks.

Richmond—(1) Black and white Kafir he goat; (2) black and white Kafir she goat.

Solferino (Gourton)—(1) Red and white ewe goat, slit in left ear; iron grey gelding, no brands or marks.

Stanger—White she goat, no brand.

Umsinga—(1) Black and white goat, no marks; (2) five black and white Kafir sheep, ewes, slit in ears; one lamb born in pound; (3) black sheep, wether, slit in left ear.

Utrecht—Chestnut stallion, off hind foot white, small star on forehead, no brands, age about three years, height 14'2; probable value, £8. Impounded on the 22nd March by I. De Jager.

ON THE 1ST JUNE.

Lower Umgeni—Brown bay gelding, branded H C on left shoulder.

Place a piece of lump salt where the cows can have access to it. They are the best judges of the amount they shall have.

Feed the cows all they can eat. If they do not pay a profit on this investment, sell the cows and buy others that will. There is no economy in trying to save feed.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 126.—Colonial, 35 years of age, desires to obtain a position as overseer or manager of an ostrich farm. Has been for some years with first-class farmers, and had charge of some of the best birds in the Cape Colony. Has a practical knowledge of incubating, rearing of chicks, dosing and general management.

No. 127.—An expert fruit packer of four years' experience in Spain and France, and twenty years Colonial experience, is open to accept an engagement after 25th April next. He is open to accept low wages, with board and lodging, and fare to and from the Cape where he is at present.

No. 128.—Wishes to secure employment on a farm. States that he has a general knowledge of engineering, and has been employed on a large and well-known farm in the Richmond Division.

No. 129.—Wishes to secure employment on a farm. Experience in gardening and agricultural work generally, but more especially the former.

No. 131.—Age 20. Was a student at College of Agriculture, Cape Colony, where he gained a diploma. Has also won prizes for butter making at the Rosebank and Port Elizabeth Shows. Has been in the services of the Orangia Creamery Co., Beth ehem, which he left on account of conditions of employment not being suitable to his requirements.

No. 132. Age 37. Has had nine years experience as Assistant and Manager on Tea Estate in Assam, and has a thorough practical knowledge of tea making in all its Departments. Would like to obtain an appointment in a Tea Garden in Natal. Has a knowledge of several Indian languages.

No. 133.—Desires appointment as Farm Manager. Has had a thorough knowledge of growing and packing fruit, also lucerne growing and hay making. Has also had experience in Ostrich and Stock farming.

No. 134. Age 37. Wishes to obtain experience on an Ostrich farm for a year. Would be willing to invest £700 at the end of the term of probation, and on the expiry of a year's partnership would be willing to increase that sum to £1,000.

No. 135.—Age 35. Has a knowledge of poultry and bee-keeping. Total abstainer. Non-smoker. Good references. Is anxious to get on to a farm.

No. 136.—Wishes to secure employment on an Ostrich farm. Very good references.

No. 137.—Understands carpentry and wagon making. Is anxious to secure a position on a farm.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

EMPLOYMENT FOR GIRLS.

The Minister of Agriculture has received a letter from the Chairman of the Transvaal Land Settlement Board, stating that he has been asked by several correspondents in England if there are any openings in South Africa, such as in creameries, for girls trained at Bromsgrove Colonial College and other such training centres in England. We should be glad to hear from any institutions or farmers in Natal who may be in a position to offer situations to girls who have been trained at such Colleges, when we shall be pleased to place them in communication with the Chairman of the Transvaal Land Settlement Board.

Agricultural and Other Shows, 1910.

CAMPERDOWN (Camperdown Agricultural Society).—Show 22nd July. Walker and Burchell, Camperdown, *Secretaries*.

DUNDEE (Dundee Agricultural Society) - Show, 23rd and 24th June. Late entries, 22nd June. J. McKenzie, Box 105, Dundee, *Secretary*.

DURBAN (Durban and Coast Society of Agriculture and Industry).—Show, 6th, 7th and 8th July, J. Morley, 399, Smith Street, Durban, *Secretary*.

DURBAN (Durban County Farmers' Association).—Hold no Show, but an Exhibit will be arranged for at the Show held by the Durban and Coast Society of Agriculture and Industry. F. J. Volett, New Germany, *Secretary*.

DURBAN (Durban and Coast Poultry Club).—Show 6th, 7th and 8th July H. M. Fletcher, 20, Castle Arcade, Durban, *Secretary*.

ESTCOURT (Weenen Agricultural Society).—Show, 21st and 22nd June. E. Cauterley, Estcourt, *Secretary*.

GREYTOWN (Umvoti Agricultural Society).—Show, 8th June. W. H. Gibbs, Box 24, Greytown, *Secretary*.

GREYTOWN (Umvoti Farmers' Association).—Date not yet fixed. C. J. Nel, Greytown, *Secretary*.

LADYSMITH (Klip River Agricultural Society) - Show, 10th and 11th June. W. J. Teasdale, Ladysmith, *Secretary*.

MID-ILLOVO (Mid-Illovo Farmers' Club). Show held under the Mid-Illovo Agricultural Society J. W. V. Montgomery, Ismont, Mid-Illovo, *Secretary*.

PIETERMARITZBURG (Royal Agricultural Society) - Show, 16th, 17th and 18th June. Duff, Eadie & Co., Timber Street, Pietermaritzburg, *Secretaries*.

PIETERMARITZBURG (Natal Poultry Club).—Show, 16th, 17th and 18th June, in conjunction with the Royal Agricultural Society's Show. E. G. Blundell, Box 250, *Secretary*.

RICHMOND (Richmond Agricultural Society). - Show 20th July. Entries close, 30th June. C. Williams, *Secretary*.

STANGER (Victoria County Agricultural Society).—Show, 29th June. H. C. Smith, Stanger, *Secretary*.

SOCIETIES HOLDING NO SHOWS.

Bryne Farmers' Association; Boston Farmers' Association; Donnybrook Farmers' Association; Dronk Vlei Farmers' Association; Garden Castle Farmers' Club; Greytown Horticultural Society; Ladysmith Farmers' Association; Malton Farmers' Association; Polela Agricultural Society; Seven Oaks Farmers' Association; Umsinga-Biggarsburg Farmers' Association; Utrecht Boeren Vereeniging; Vryheid Agricultural Society.

Frere Dipping Association; Altred County Farmers' Association and Agricultural Society.

Government Laboratory.

SCALE OF CHARGES FOR ANALYSES, VACCINES, ETC.

The following is the scale of charges fixed for analyses, etc., at the Government Laboratory, Alberton, Pietermaritzburg:

Drinking-water Analysis:		£	s.	d.
Chemical .. .. .	..	2	2	0
Bacteriological .. .. .	..	5	5	0
Milk, Analysis .. .. .	..	0	10	6
Sputum, Bacterioscopic examination .. .. .	..	0	5	0
Biological test for Tubercle .. .. .	..	1	1	0
Throat-swabs for Diphtheria (prepared swabs obtainable on application):				
Bacteriological Report .. .. .	..	0	2	6
Urine, ordinary clinical examination .. .. .	..	0	5	0
Quantitative estimation of glucose .. .. .	..	0	10	6
Biological test for Tubercle .. .. .	..	1	1	0
Fæces, for Ankylostomiasis .. .. .	..	0	2	6
Blood (collecting outfit obtainable on application)				
agglutination test for Typhoid (Widal), Paratyphoid, Malta Fever, etc. .. .. .	..	0	5	0
Tumours and Morbid Tissue:				
Microscopic examination	10s. 6d. to	2	2	0
Post Mortem examinations	10s. 6d. to	5	5	0
Toxicological examinations	10s. 6d. to	21	0	0
X-ray examinations, blood-counts, etc., by special arrangement.				

The following sera, vaccines, etc., are issued at the prices indicated:—

Anthrax Inoculation, per double dose of two inoculations ..	0	6
Anti-Diphtheritic Serum, per dose	5	0
Anti-Streptococcal Serum, per dose	2	0
Anti-Tetanic Serum, per dose	2	0
Mallein, per dose	0	4
Tuberculin, per dose	0	4
Anti-Venene (for snake bites), per dose	5	0
Blue Tongue Vaccine, per 25 doses	2	0
Blue Tongue Curative Serum, per 50 cub. c.	2	6
Quarter Evil Vaccine (in five and ten dose packets), per dose	0	3
Q. E. V., Double Inoculation, per dose	0	6

Appliances for inoculations, syringes, etc., are also supplied from the Laboratory.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

POULTRY.

Orders will be received for eggs for sitting of the following breeds for immediate delivery :—Buff Orpingtons, White Leghorns, Silver Wyandottes and Plymouth Rocks.

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

WOOLLED SHEEP.

Offers are invited for young imported Rams being Rambouillet Merinos, Lincolns, Hampshires, Shropshires. Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible :—

Admittance of Students to the School of Agriculture.—House Master, Cedara.
Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.
Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.
Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.
Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.
Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.
Agricultural Seeds, etc., for Irrigation Farming.—Curator, Govt Station, Weenen.
Fruit.—Orchardist, Cedara.
Accounting Business.—Accounting Clerk, Cedara.
Woollen Sheep, Woollen Classings, &c.—Wool Expert, Cedara.
Apiculture.—Apiarist, Cedara.

E. R. SAWER,

Director, Division Agriculture and Forestry, Cedara.

When the weather is cold, the butter is sometimes slow in coming because the cream is too cold, or too old. In the summer time it is often too sour and too warm. A thermometer helps to decide. The best temperature is about sixty-eight to seventy-two degrees.

Farm Apprentices' Bureau.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

- | | | | |
|--------|---------|---|---|
| No. 3. | Age 24. | Colonial born | Has a knowledge of bookkeeping. |
| „ 15. | Age 19. | Is desirous of learning farming. | |
| „ 25. | Age 23. | Bricklayer by trade. | Is anxious to get on a farm. |
| „ 27. | Age 19. | Has had one year's experience on a farm in the Cape Colony. | |
| „ 35. | Age 21. | Has had five years' experience on farms. | Understands cattle and horses and Agriculture. Is anxious to get back on a farm. |
| „ 40. | Age 24. | Has had a little experience of farm life. | Understands bee-keeping. Is anxious to get on a farm. |
| „ 46. | Age 21. | Served a term of apprenticeship to a firm of agricultural implement makers. | Industrious and level-headed lad. Very good references. |
| „ 47. | Age 21. | Is anxious to obtain a situation on a farm. | Has been in iron-mongery trade for 2½ years. |
| „ 48. | Age 18. | Has had 4½ years' experience in agricultural and stock farming in the Dundee and Ixopo Divisions. | Has had a good deal of experience with cattle, but not much with sheep. Has also had experience with poultry and a little with bees. Is a good Zulu linguist. |
| „ 49. | Age 21. | Colonial born. | Has had three years' experience on farms, two years in the Mooi River Division and one year dairy farming in the Transvaal. Good references. Speaks Zulu. |
| „ 51. | Age 21. | Is very desirous of getting on to a stock farm. | Is strong and healthy. Has had a fair training in bookkeeping. |
| „ 53. | Age 17. | Has had 18 months' experience of farming in Zululand. | Speaks Zulu. Understands cattle and horses. |
| „ 54. | Age 18. | Has had 18 months' experience of farming at Harrismith. | Speaks Zulu and Dutch. Understands cattle and horses. Is anxious to get back on a farm. |
| „ 55. | Age 16. | Has had a little experience. | Speaks Zulu. Understands carpentry. Has been engaged in a Solicitor's office for four years. Is very obliging and willing. Anxious to get on to a farm. |

Executives of Farmers' Associations.

*** The Editor will be obliged if the Secretaries of Farmers' Associations and similar institutions will kindly keep him advised with regard to changes in the personnel of their Executives.*

ALEXANDRA AGRICULTURAL AND HORTICULTURAL ASSOCIATION.—President: Wm Thompson. Hon Vice-Presidents: A Blamey, E W Hawksworth, Thos Kirkman, H Basley, J L Knight, R.M. Hon Secretary and Treasurer: Geo Lamb. Hon Auditor: W B Brunner. Committee: W Arnott, H G Arbuthnot, R C Archibald, R G Archibald, J Bazley, A Behrmann, W Cooke, G F Crookes, R Cruickshank, H D Hawksworth, H E Hawksworth, A F W Hawksworth, R C Hawksworth, J Landers, D McAndrew, F Nelson, C A Preston, Dr Rouillard, W A Gilbert, Fred Blamey, Rev B M Ford, S C Hawksworth, J C Landers, S F Crookes, J J Crookes, R A Lindsay, J A Curle, F B I'nton, R Parkin, H Reynolds, J B Stewart, C Taylor, H H P Waller, J Ross, Rev W C Wilcox, Dr W P Tritton.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A G Prentice, J.P. Vice-Presidents: C Knox, J.P., C F Rethman and C A Holwell. Hon Secretary and Treasurer: H C Hitchins. Committee: C M Etheridge, H S Morgan, Rev S A Aitchison, J.P., W B Rethman, Dr W Case, J.P., H W F Rethman, R G Mack, E J Gray.

BOSTON FARMERS' ASSOCIATION.—President: Thos. Fleming, J.P. Vice-President: T. W. Rudland. Hon. Secretary: W. J. Fly, J.P. Hon. Treasurer: H. A. Phipson.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, J.P. Vice-Presidents: J Gavin and John W Harvey, J.P. Hon Secretary: W E Allsopp.

CAMPERDOWN DIVISION FARMERS' ASSOCIATION.—President: C J A Scheepers. Vice-President: F N Meyers. Hon Secretary and Treasurer: J Baker. Committee: J Gavin, J W Harvey, J.P., C Baker, J Moon, J.P., H A Meyers, J F Scheepers, J Galtrey, B B Buchanan. Secretary and Treasurer: Jas Baker, P.O., Umlaas Road.

CHARLESTOWN FARMERS' ASSOCIATION.—President: Johannes Vos. Vice-President: — Adendorff. Secretary: W. J. Curnow. Treasurer: J. O. Thomas. Committee: H. O. Eksteen, J. P. Vos, J. C. Uys, W. G. Thomas, D. Doyer, F. A. R. Johnstone, M.L.A., G. E. Lane, S. R. Higgins, B. F. Johnstone, A. J. Johnstone, J. J. Eksteen, R. H. Greaves, Peter Thompson, G. McArthur, and V. B. van Rooyen.

DONK VLEI FARMERS' ASSOCIATION.—President: Capt A W B Percival. Vice-President: J H Dalgarno. Hon Secretary and Treasurer: A Hodson Creighton.

DUNDEE AGRICULTURAL SOCIETY.—President: T. P. Smith. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs F Turton, H. Rvley, and A W Smallie. Hon Secretary and Treasurer: J McKenzie. Committee: G M De Waal, B J Humann, R Doidge, H P Walker, T J Williams, W Springorum, H W Walwyn, W J H Muller, D M Meumann, H J Head, C T Vermaak, A L Jansen, J Campbell, H Greenhough, D W H Tandy, A E Norman.

DURBAN AND COAST SOCIETY OF AGRICULTURE AND INDUSTRY.—President: E. W. Evans. Vice-Presidents: Sir B. W. Greenacre, A. M. Campbell, Hon. Marshall Campbell, M.L.C., W. Adams, Frank Stevens, C.M.G., M. S. Evans, M.L.A., P. D. Simmons, W. R. Poynton, Hon. C. G. Smith, M.L.C., G. S. Armstrong, M.L.A., H. R. Bousfield, W. G. Brown, C. Henwood, J. Livingston, John Nicol, C.M.G., H. H. Puntan, R. H. Wisely, V. Seymour, H. Sparks. Secretary: John Morley. Committee: J. Ellis Brown, J. Burman, C. A. L. Bull, D. Doyle, Samuel Deane, James Henderson, W. Konigkramer, W. D. Kimber, W. J. Mirreles, W. Milne, J. Swales, W. J. Thompson, C. Wilson, Wilfred Payne, Wallis Short, S. T. Amos, J. McBride, F. M. Hillier, W. A. Stocken, and W. A. Bath. Treasurer: Edwin Greenacre. Auditor: W. Murray Smith.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J H Colenbrander. President: J McIntosh. Vice-Presidents: H Westermeyer, R R McDonald. Committee: F R W Böhmer, G Compton, H Freese, W Freese, W Gillitt, H W Koenigkramer, H W Nichols, F Schafermann. Hon Secretary and Treasurer: Frank J Volek.

EMPANGENI AND DISTRICT SUGAR PLANTERS' AND FARMERS' ASSOCIATION.—President: Col. C. B. Addison. Vice-President: P. Stott. Secretary and Treasurer: P. Piccione, P.O. Empangeni. Executive: P. Addison, G. Higgs, — Salveson, — Blake.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J R Pennefather. Vice-President: C F Adams. Secretary: T Parkins. Treasurer: W T Brockwell.

GOURTON FARMERS' ASSOCIATION.—Chairman: M Sandison. Vice-Chairman: R Gray. Hon Secretary and Treasurer: Frederick B Burnard, Highfield P.O. Committee: Dr Landon, J.P., E Reed, J Woods, C van der Merwe.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: A W Smallie. Vice-President: Thos Brookes. Hon Secretary and Treasurer: R J Hearn. Committee: G Queddon, N Glutz, Wm Craig, W R Quedsted, W T Heslop, Thos Dewar, A E Norman, D P Campbell, J J Grove, H J Hearn, D W H Tandy, J B Pendar, J Campbell, J Barbour.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C Gold, Dartford, Underberg. Vice-Presidents: F E Peto, G H Royston, J B Nicholson. Hon Secretary and Treasurer: G Palframan, Watermead, Underberg. Executive Committee: G Malcolm, W S Johnston, P McKenzie, F E Peto, J S Gordon. Yard Steward: D T Malcolm. Auditors: T C Dearlove and F E Peto.

HOWICK FARMERS' ASSOCIATION.—Chairman: Thos Morton. Vice-Chairman: M A Sutton. Hon Secretary and Treasurer: A Clark.

INGOGO FARMERS' ASSOCIATION.—President: E. W. Noyce. Vice-Presidents: G. A. Fimstone and D. A. Drummond. Hon Secretary and Treasurer: C. Drummond. Committee: W C F Napier, A Paine, A J Garriock, A Wood, J.P., J H Green-Thompson, G H Bishop.

IXOPO AGRICULTURAL SOCIETY.—President: F L Thring, J.P. Vice-Presidents: Col W Arnott, B.M.R., W K Anderson, J.P., C E Hancock, J.P. Committee: John Anderson, Thos Allen, J C Auld, H D Archibald, F S Benningfield, S Boyd, T L Clarence, F E Foxon, R.M., Wm Foster, Jas T Foster, C C Foster, Geo E Francis, L Gray, A M Greer, J.P., J R Greer, Wm Gold, H A Hill, C F Harris, A E Keith, R Kennedy, Geo Martin, W Oakes, L J Phipps, T F Remfry, J W Robinson, Jas Schofield, M.L.A., D C Smail, A Stone, W R Way, A H Walker, M.L.A., P D Webb. Hon Secretary: G C Way, Hon Assistant Secretary: A G Harris. Hon Treasurer: T Arnott.

IXOPO FARMERS' ASSOCIATION.—President: C. E. Hancock, J.P. Vice-Presidents: T. F. Remfry and R. Vause. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers' Union: Col. Arnott and T. F. Remfry, with W. D. Campbell as reserve. Committee: John Anderson, W. Oakes, D. Campbell, G. C. Way, James Foster, A. Keith, G. Martin, F. Z. Thring, A. C. Kirkman.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Daniel Bester, Vice-Presidents: Herman Illing, J G Bester, Wm A Illing. Secretary and Treasurer: Edward V Bambrick (Box 90, Ladysmith). Executive Committee: A Brink, J Farquhar, C.M.G., M.L.A., W C Hattingh, J G Hyde, Trev Hyde, A I Horsley, W Freer, L A Leonard, H Nicholson, H C Thornhill, Herman Illing, D Munger, P de Waal, J H Newton, D Sparks, J.P., J T Francis, A W (Gus) Illing, G Pinkney, W Cochrane, George L Coventry, and *ex officio* officers.

KRANTZKOP FARMERS' ASSOCIATION.—President: Capt M Landsberg. Vice President: P R Vermaak. Hon Secretary and Treasurer: G T van Rooyen. Committee: C J van Rooyen (Albany), C J van Rooyen (Wonderfontein), J. A. G. Mare, L M van Rooyen, Jnr, R P Martens, J P Nel, Dr Proksch, and F E van Rooyen.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson. Vice-President: H Nisbet. Executive Committee: H Nisbet, M A Sutton, A J Holmes, J Humphries, Jno Pole, and W A Lawton. Auditor: W J R Harvard. Hon Secretary and Treasurer: Arthur F Dicks, P.O. Box 1, Howick.

LITTLE TUGELA FARMERS' ASSOCIATION.—President: F J de Waal, J.P. Vice-President: F G King. Secretary and Treasurer: F W Holmes. Committee: P R Summersgill, H L Francis, D Buchanan, Geo. Spearman, W C Stockil, J.P.

LOTENI FARMERS' ASSOCIATION.—President: J A Tod. Vice-President: T Carter. Hon Secretary: A Kennedy Stone.

LOWER TUGELA DIVISION ASSOCIATION.—President: A E Foss. Vice President: W. R. Hindson. Hon Secretary and Treasurer: H Curtis Smith (Stanger) Committee: A S L Hulett, F Addison, G Stewart, T G Colenbrander.

LOWER UMZIMKULU AGRICULTURAL ASSOCIATION.—President: D C Aiken, J.P. Vice-Presidents: H Aihers and C H Mitchell, J.P. Hon Secretary and Treasurer: W J Plows. Committee: C Manning, J W Aiken, W G Camp, T F Godwin, J Hutton, H Norden and A Borchard. Hon Secretary, Show Committee: J W Aiken. Show Committee: A E Collison, A Borchard, F Knoop, A Ringo, H F Voigts, J Hutton, C Manning, A J Lugg and H Albers. Hon Auditor: J W Aiken.

MID-ILLOVO FARMERS' CLUB.—Chairman: H S Power, J.P. Vice-Chairman: B B Evans. Hon Secretary: J W V Montgomery. Assistant Hon. Secretary: A L Wingfield. Hon Treasurer: Jos McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: R Garland. Vice-President: C B Lloyd. Hon Treasurer: H A Rohde. Collector: Capt W H Stevenson. Auditor: Claude Scctt. Hon Secretary: H B Hall.

MUDEN AGRICULTURAL ASSOCIATION.—President: Otto Rottcher, J.P. Vice-President: T Thresh. Secretary and Treasurer: C A Selling. Committee: H Beauland, Karl Rottcher, B J van Zuydam, J.P., Fritz Rottcher, E A Grantham, R O Evans, W H Elley, H Rottcher, jun.

NEWCASTLE.—President: F A R Johnstone, J.P. Vice-President: C Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O Schwikkard, C.M.G., Newcastle. Secretary: Wm Beardall. Treasurer: Ed Nicols. Executive Committee: L H S Jones, E Phillips, H C Caldecott, C Watson, G Langley, W A Lang, W J P Adendorff, J E de Wet, O Davis, S W Reynolds, B Pettigrew, G W Thomas, G H Bishop, H R Muir, M C Adendorff, W Napier, P Van Breda, Chriss Botha, G Templar.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: G C Mackenzie. Vice-Presidents: J C Watt, J.P., and R H Oellermann. Life Member: C A S Yonge, M.L.A. Secretary and Treasurer: W D Stewart, New Hanover. Auditor: J H F Hohls. Committee: W N Angus, E Bentley, W W Bentley, Edward Boast, E E Comins, G R Comins, C Crookes, jun, H Dinkelmann, J Duval, W Fortmann, Dr C H Herbert, J Hillermann, J H F Hohls, H Jacobson, H A Light, G C Mackenzie, A F Mackenzie, T M Mackenzie, J Muirhead, J.P., Oswald Muirhead, G Moe, J.P., J Moe, O Moe, C Oellermann, F Oellermann, C J Oellermann, W Ortmann, J C Otto, E Peckham, J.P., J A Potterill, S Peckham, C M Scott, Rev J Scott, Wm Schroeder, J.P., Owen Solomon, J H Smith, Riby Smith, F Thole, H Vorwerk, H F Westbrook, W H Westbrook, C Westbrook, T Wolluter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P. Vice-Presidents: F Mummbrauer, P Kodeshorst, W Dralle, W Wortmann. Committee: W Bartsels, F Bosse, H Branner, A J Bruyns, H Bruyns, Carl Dralle, H Gebers, W Gevers, J H Holley, jun, W C Holley, C Hillermann, L Koch, H Kohler, F E Kuhn, M Maister, H Merzis, A Meyer, H Meyer-Estorf, H W Meyer, K A Meyer, H Misselhorn, W Misselhorn, K Peters, I Pfothenhauer, G Rabe, G Reiche, Joh Reiche, W Rencken, H Rosenbrock, H Schmidt, K Schmidt. Rev Jas Scott, K Seele, F J Smith, J Thies, W Witthoft, P Worthmann, A Worthmann, F Worthmann, H Worthmann. Secretary: Paul Vietzen, P.O., Singletree. Hon Treasurer: E Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: B. Greene Vice-President: Geo Ross. Secretary and Treasurer: H Singleton, Nottingham Road. Committee: J King, J G Parker, J J Morton, A Pearce, W Wood, C J King, A Mengens, K Soutar, W F Taylor, W A Dales.

PIETERMARITZBURGSCHIE BOEREN VEREENIGING.—President: D P Boshoff. Secretary: E G Jansen, 313, Loop Street, Maritzburg.

POLELA AGRICULTURAL AND HORTICULTURAL SOCIETY.—President: J Isbister. Vice-Presidents: W H Allwright, J F Alexander, and H Brown. Hon. Secretary and Treasurer: J Anderson Speak. Auditor: A Brown. Executive Committee: J Isbister, W H Allwright, J F Alexander, H Brown, H J Gazzard, G W Foster, J Anderson Speak. Hall Committee: W H Allwright, F Crossley, A Brown, with the trustees—J F Alexander, H E Mingey, and Geo Forder.

QUDENI FARMERS' ASSOCIATION.—President: P E Tittlestad. Vice-President: W Calverley. Hon Secretary and Treasurer: E Tittlestad. Committee: H A Koch, S N Robbins, G M Anderson, B B Bunting, E Tittlestad.

RICHMOND AGRICULTURAL SOCIETY.—President: John Marwick. Vice-Presidents: W P Payn, J W T Marwick, C O and J W McKenzie and Chas Nicholson. Hon Treasurer: R Nicholson. Hon Secretary: Cecil Williams. Committee: Evan Harries, R A McKenzie, H M Moyes, Thos Marwick, J C Nicholson, J W Flett, A W Cooper, J.P., J W Hammond, C E Simes, Tom McCrystal, and the seven office-bearers (*ex-officio*).

RICHMOND ROAD FARMERS' ASSOCIATION.—President: Thos Stead, J.P. Vice-President: W Mapstone. Secretary and Treasurer: W L Stead, New Leeds. P.O. Committee: D Malcolm, J Mapstone, W P Payne, J James, J Sinclair, W S Crouch, H B Boyd, W Middleton, W Oldfield, T E Horwood.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G M Sutton, K.C.M.G. Vice-Presidents: W S Crart, Jas King, D C Dick, G J Macfarlane, C.M.G., O Hosking, with His Worship the Mayor, *ex-officio*. Secretaries, Treasurers and Collectors: Duff, Eadie & Co, 12, Timber Street, Pietermaritzburg. Yard Superintendent: H J Stirton. General Committee: T J Allison, W H Buchanan, F G Burchell, W H Cobby, P H Campbell, R Comins, W P Gough, E

S Goodwill, K H Hathorn, K.C., T W J Hall, J Hall, L Line, Col Sir D Mackenzie, K.C.M.G., Jas Morton, Sir T K Murray, Jno Moon, W J O'Brien, P Otto, R H Pepworth, J F Potterill, A Robinson, Rev J Scott, P D Simmons, H Solomon, W L Stead, H J Stirton, Dr Oddin Taylor, F W Jameson S J Mason. Executive Committee: President, Vice-Presidents, and W J O'Brien, W H Cobby, K H Hathorn, K.C., and Col E M Greene. Members appointed by Corporation: Councillors Ireland, Sanders and Hathorn.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P J Kemp. Executive Committee: J J Uys, J Z Moolenaar, T J Botha, P J Viljoen, P J Kemp. Hon Secretary and Treasurer, Thys Uys, Utrecht P.O.

UMSINGA-BIGGARSBERG FARMERS' ASSOCIATION.—President: E C Nuss. Vice-President and Acting Secretary: Geo S Saunders, Helpmakaar.

UMVOTI AGRICULTURAL SOCIETY.—President: J M van Rooyen. Vice-Presidents: Col G Leuchars, Major T Menne, E J van Rooyen. Executive Committee: M Landsberg, Lucas Mare, W Lilje, E T Hill, A F Handley, W J S Newmarch, R J van Rooyen, O Norton, I M Nel, D B Menne. Hon. Auditor: A Allan Duff. Secretary and Treasurer: W H Gibbs.

UMVOTI FARMERS' ASSOCIATION.—President: P R Botha (J's son). Vice-President: J M Handley. Secretary and Treasurer: G E Cadle (Box 6, Greytown). Auditor: J M Nel. Committee: W J Slatter, J G Nel, H F Torlage, R J Landsberg, A Newmarch, P H van Rooyen, A F Handley.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: W L Oldacre. Vice-President: G Langley. Hon Secretary: W F B Sutherland.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L Viljoen. Vice-Chairman: B H Breytenbach. Members: I Bierman, M M Knight, J H Kloppe, B C Hattingh, T Botha, M Gregory, P L Uys, H P Breytenbach. Secretary: G J Shawe.

UTRECHT BOEREN VEREENIGING.—President: D J A van der Spuy. Secretary: G J Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut-Col F Addison. Vice-Presidents: Hon W F Clayton, M.L.A., W J Thompson Esq., J.P., E Saunders, M.L.A. Committee: Messrs R H Creighton, J Brown, H E Essery, A E Foss, J.P., A S L Hulett, J.P., J B Hulett, F R Potes, A S Knox, W Warren, F C Webb. Hon Secretary and Treasurer: H Curtis Smith (Stanger).

VRYHEID (WARD I.) AGRICULTURAL SOCIETY.—President: E Dalton. Vice-President: J F Potgieter. Secretary: F Kolbe. Assistant Secretary: H Lombaard. Committee: Secretary, Assistant Secretary, and A von Leviczow, T Ries, P Grobler, F Molman, A Steenkamp.

WEENEN AGRICULTURAL SOCIETY.—President: Allan Stuart. Vice-Presidents: R Garland, R H Ralfe, F I de Waal. Hon Treasurer: F C Schiever. Hon Secretary: E Cautherley. Auditor: S Wolff. Executive Committee: Hon H D Winter, M.L.A., J W Moor, M.L.A., D W Mackay, T H Hindle and L L'Estrange. Manager of Show Yard: S Vaughan. Assistant: A Clouston.

WEENEN COUNTY HORTICULTURAL SOCIETY. Committee of Management: The President and Treasurer of the Weenen Agricultural Society and C J Offord, G W Linfoot, T J Nunn, Dr Brewitt, S Vaughan. Hon Secretary: F Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F W White. Vice-President: C E Symonds. Secretary: R H McAlister. Committee: Hon D C Uijs, A W Symonds, H T James, R J Ortlepp, J N R Dixon.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G H Hulett. Vice-President: C Hill. Hon Secretary and Treasurer: F Brammage, Ginginhlovu.

East Coast Fever Advisory Committees.

(NOTE.—Owing to sparse European population, the following Magisterial Divisions have no Advisory Boards: Ubombo, Mapumulo, Ingwavuma, Mahlabatini, Ndwandwe, Nkandhla and Hlabisa.)

ALEXANDRA.—Chairman: W Thompson, Umzinto. Members: H Baxley, R C Archibald, A Blamey, H Reynolds, G J Crookes, R Parkin, J A Curle.

ALFRED.—Chairman: Magistrate. Members: A G Prentice, Rev. S Aitchison, J E Brown, F H Boddy, H M Raw, H Rethman, H C Hitchens, H J R Hatchwell, W P Bouserie.

BERGVILLE.—Chairman: T E Zunckel, J.P., Bergville. Members: P H Van der Riet, J G Fannin, H Jackson, C Halferty, F Zunckel, Mbulali—Consulting member for natives.

BULWER.—Chairman: Magistrate. Members: R Comrie, Wm Colville, R Gordon, H Cole, P Garson, P McKenzie, G Malcolm, H C Gold, R Justice, E Stafford, W Little.

CAMPERDOWN.—Chairman: A N Kirkman, Cato Ridge. Members: J F Erfmann, P J Kingham, W B Turner, C J A Scheepers, W Mercer, L G Wingfield Stratford, J W Harvey, B B Evans, J W V Montgomery, B R Buchanan, W L Stead. *SUB-DIVISIONAL BOARDS.*—No. 1. *East of Railway Line from "Spitzkop" to Railway Line.*—Chairman: J F Erfmann, Cato Ridge. Members: P J Kingham, H Dinklemann, F L Meyer, J H Meyer, H A Meyer. No. 2. *East of Railway Line from West of Government Fence.*—Chairman: C J A Scheepers, Thorneybush. Members: W B Turner, W Mills, J F Scheepers, H Nadauld, G S Phipson. No. 3. *West of Railway Line from Koning Krantz to Killairney and along Umlaas River.*—Chairman: A N Kirkman, Clairmont. Members: W Mercer, W Brown, R Godfrey, W S Meyer, E W Meyer. No. 4. *West of Railway Line, rest of Division between Main Line, Umlaas River Boundary of No 3.*—Chairman: W L Stead, Thornville Junction. Members: F H Meyer, J R Schwegmann, W E Schwegmann, W S Crouch, B R Buchanan (Hon. Sec., Manderston). No. 5. *West of Main Line, Beaumont, East of Main Mid-Illovo River from Westley's Drift to Unguaranta River.*—Chairman: J W Harvey, Camperdown. Members: L G Wingfield Stratford, R Lyne, O A Hutton, E H Hayes, F E Groom. No. 6. *Mid-Illovo West of Line, rest of Division South of Umlaas River.*—Chairman: B B Evans. Members: J W V Montgomery, J H McCullough, J Ballam, J James, H S Power.

DUNDEE.—Chairman: F Turton, Glencoe Junction. Members: J Campbell, J J Grove, H Wiltshire, G M De Waal, Aug Jansen, A J Potgieter, A Cronje, A Schuid, H Greenhough. *SUB-DIVISIONAL BOARDS.*—*Glencoe Sub-area.*—Members: F Turton, H Greenhough, W H Miller, F Schroeder, V Marshall, J Lausen, J J De Jager, Rev Father Rauch (Native interests). *Hatting Spruit Sub-area.*—Members: J J Grove, H A J Davil, A E Norman, J Campbell, Rev J Dewar (Native interests). *East of Helpmakaar Road.*—Members: A M Cronji, D C Pieters, P Meyer, J A Naude, A Jansen. *West of Helpmakaar Road.*—Members: A J G Meyer, A P Lund, D C Uys, A J Van Tonder, Jun, A J Potgieter. Members of Joint Committee for Area West of Helpmakaar: A J Potgieter, A P Lund. Members of Joint Committee for Area East of Helpmakaar: A Jansen, A M Cronji. *Area between Main Vryheid Railway Lines.*—Members, W Craig, H Wiltshire, C M Meyer, Sen, A Spies, Jun, C M De Waal.

DURBAN BOROUGH.—Chairman: E L Acutt, Durban. Members: H R Bousfield, R Benningfield, G Swales, J Haynes, — Arthur.

EMTONJANENI.—Chairman: Magistrate. Members: F W Smith, H J James, F W White, A W Symmonds, R J Ortlepp, D C Uys, L J Van Rooyen.

ESHOWE.—Chairman: A Boast, Magistrate. Members: A Moore, G H Hulett, C F Adams, T Parkins, A T Wantink, F J Dickens, H H Thole.

ESTCOURT.—*Ward 2, East of Main Line.*—Chairman: A Stuart. Members: Magistrate, J Ralfe, J W Haw, J G Hatting, A Peniston, A B Haviland, G M Rudolph. *Ward No. 3. (Boundaries):* The Bergville Magisterial Division, Tugela to junction of the two Tugelas; The Winterton Settlement fence to Vaai Plaats fence and Ovington and Sibhamie's Location fence, and from there to Government Game Reserve).—Chairman: H J De Waal, Glenisla. Members: R Gray, M Sanderson, R J Land, A Spearman, H L Bacon. *Ward No. 4 (Estcourt West of Railway Line; follow Bushman's River as far as Mr. Kerr's farm, then Nalaara's Location fence as far as Game Reserve).*—Chairman: R H Ralfe. Members: F C Schiever, J Rencken, W Couch, P Male, T L Fyvie, J Hatting, A W J Hatting. *Ward No. 5 (Boundaries: Remainder of District West of Line).*—Chairman: H Blaker, Estcourt. Members: W Comins, E B Griffin, H A Woodruffe, Col. Crompton, J Russell, A C Robinson, Jun, A E Downing, A D Shaw, J W Bentley.

GREYTOWN.—Chairman: Paul Hansmeyer, Greytown. Members: D Havemann, A Newmarch, J A Nel, W T Slatter, A T Handley, H S Botha. *Central Board.*—Chairman: P Hansmeyer, Greytown. Members: J A Nel, A Newmarch, W J S Newmarch, T K Taylor, S W Cadle, R J Van Rooyen, E J Van Rooyen, J G Nel.

INANDA.—Chairman: C R Bishop, J.P., Umgeni. Members: R Harrison, W Sykes, Jun, E Dore, W Campbell, R Armstrong.

KLIP RIVER.—No. 1 (A line from Elands Laagte along the Matawaans and

Jononos Kop to the Berg; North line, Dundee boundary: all West of Main Line).—Members: C Mitchell Innes, R M Gray, L Meyer, J C Henderson, C Allen. **No. 2** (O.R.C. line and boundary No. 1). **Members:** D Bester, A J Marais, W Allison, J Bester, — Brink. **No. 3** (From Klip River Bridge to Sand Spruit, and up Sand Spruit to its source in the Berg).—**Members:** H A Potgieter, A A Wetherell, B Nel, F Van Rooyen, H Portsmouth. **No. 4** (Rest of Division South and East of Sand Spruit and West of Main Line).—**Members:** W Leathern, H Illing, J H Newton, E Robinson, G W Willis. **No. 6** (Whole of Division East of Main Line).—**Chairman:** J G de Waal. **Members:** R A Smith, H Nicholson, P Cronje, J Farquhar.

KRANTZKOP.—**Chairman:** L L D Proksch, Krantzkop. **Members:** L M J Van Rooyen, L M J Van Rooyen, F E Van Rooyen, J H Van Rooyen, J P Zietsman, A Johnson.

IXOPO.—**Chairman:** Magistrate. **Members:** Thos Allen, Geo Martin, E Marriott, A Stone, G A Cooper, J.P., Wm Gray, D Campbell, F L Thring, J.P.

LION'S RIVER.—**No. 1** (Southern portion of West of Main Line).—**Chairman:** U K McKenzie, Lidgetton. **Members:** R J Spiers, F North, A McLean, J Morphew. **No. 2** (Northern portion West of Main Line).—**Chairman:** G Ross, Nottingham Road. **Members:** J Clouston, K Soutar, D Connel, D Smythe. **No. 3** (Southern portion East of Main Line).—J W Dicks, "Rosebank," Howick. **Members:** W M Henderson, — Buchanan, Jos Raw, H J McKenzie. **No. 4** (Northern portion East of Main Line).—**Chairman:** H Burgmann. **Members:** W Methley, G Hutchinson, J J Morton, B Taylor. (The whole of the members of the Sub-Divisional Boards constitute the Central Board with the Magistrate, Lion's River, as Chairman.)

LITTLE TUGELA, WARD 3.—**Chairman:** F J de Waal, J.P., Glenisla P.O. **Members:** R Gray, J.P., S Woods, W C Stockil, J.P., R J Lund, Geo Spearman, H L Bacon.

IMPENDHLE.—**Chairman:** T Fleming, Boston. **Members:** J Martens, P J Lourens, T Carter, C W Brooke, J W McLean, H Boike, C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell. *Sub-Committee appointed for Northern portion of Division* (added to Lion's River Division).—**Chairman:** P J Lourens, Insinga, via Nottingham Road. **Members:** H Boek, C N Brooke, T Carter, J Martens, J W McLean. *Sub-Committee for Southern portion of Impendhle.*—**Chairman:** T Fleming, Boston. **Members:** C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell.

LOWER TUGELA.—**Members:** W H B Addison, A E Jackson, H E Essery, A S L Hulett, J Brown, W O Robbins.

LOWER UMZIMKULU.—**Chairman:** Col. J F Rethman, North Shepstone. **Members:** Col. J R Royston, D C Aitken, J.P., C H Mitchell, J.P., G P Beachcroft, Claude Manning, H Albers, N Harper, J S Clarke, A Borchard, T Stapleton, Col. Bru-de-Wold.

MOOI RIVER.—**Chairman:** W. G. Randles. **Members:** J. H. Wallace, H. F. Cadle, R. Garland, John Bartholomew, J. W. Johnstone, C. R. Skottowe, J. N. Boshoff, J. R. Lindsay.

MTUNZINI.—**Chairman:** Magistrate. **Members:** F Green, G M J Gielink, G Getkate, W Saville, A H Konigkramer.

NEWCASTLE.—**No 1** (to be known as Charlestown-Ingogo District from main line of Railway where it strikes the Southern line of the farm Cloutant West, thence along Western boundary of said farm, thence along S. W. boundary of Tipperary West, thence Southern boundaries of Hamstead, Dumferline and Rooderport, thence along the Northern side of the Botha's Pass main road to where it joins the O.R.C. Boundary, thence along the boundary of the Colony, thence along the Charlestown Fence to where it joins the Railway line near Mount Prospect Gate, thence along the Railway line to Cloutant West).—**Chairman:** J Vos, Charlestown F.O. **Members:** W J Adendorff, A J Johnstone, A Paine, A H Trouw, Angus Wood. **No. 2** (Newcastle district Southern boundary of No. 1 along Railway line from Cloutant West, including portion of Town Lands, Newcastle, which by agreement with Government is considered to be West of line, thence along Railway line where it strikes the Southern boundary of the farm Kopjeallen, thence along Southern boundaries of Kopjeallen, The Gardens, and Lincoln to the Ingagane River, thence up the Ingagane up to the farm Falixtowe, along Southern boundaries of Falixtown, B. Iwerton, Brooklyn, Stonehenge, Tathamscamp, Hanover, Ellenadale, Endael, Bejvisel, Stelazies Kop, Mount Blanc, to O.R.C. border fence, thence along O.R.C. boundary joining Southern boundary of No. 1 at Botha's

Pass).—Chairman: S W Reynolds. Members: F A R Johnstone, W Moller, J.P., L H S Jones, C Earl, F Meyer, J J Muller, — Van Breda, J Macdonald, J C Adendorff, E Sanders. **No. 3. Dannhauser District** (Bounded by Southern District No. 2 from the Railway line at Kopjeallen to the Berg, thence along O.R.C. border, the boundary between Newcastle and Klip River Divisions, thence along the Railway line to the farm Kopjealen).—Chairman: W L Oldacre, Dannhauser. Members: Geo Friend, B Harrington, L J Muller, J Ecksteen, E Hodson, W Watson, Ted Twyman, G Langley, Don Urquhart. **No. 4** (East of Railway Line, along the boundary between Newcastle and Dundee Divisions from the Railway Line near Dannhauser to the Buffalo River, along the Buffalo River to the junction of the Ingagane, thence along the Ingagane to its junction with the Ineander, thence along the Ineander to the fence of the Newcastle Town Lands, known as the Eastern boundary of the Railway Line, thence along the Eastern side of the Railway Line to the Magisterial Division boundary near Dannhauser).—Chairman: T K Boshoff, Dannhauser. Members: J H Potgieter, H Miller, J H van der Westerhuizen, J J Kemp, W Dicks, C Uys. **No. 5** (the strip of land lying between the Railway Line and the Buffalo River from the Ingagane and Ineander streams, which form the North-Western boundary of No. 4 district).—Chairman: E W. Noyce, Boscobello P.O.; members, Geo Matthews, T K Panzera. **Central Board.**—Chairman: S W Reynolds, Newcastle. Members: F A R Johnstone, J Vos, Sen, Angus Wood, W Oldacre, W Watson, E W Noyce, F N Panzera, T R Boshoff, J H van der Westhuizen.

NEW HANOVER.—Central Board. Chairman: E Newmarch. Members: W W Bentley, T C Wolluter, F Reiche, H Schmidt, E Lindhorst, W L'Estrange, A F McKenzie, W Meyer. **New Hanover Sub-Committee.**—Chairman: E Newmarch. Members: Jno Moe, W W Bentley, W Ortmann, T C Wolluter, O J Muirhead. **Dalton Sub-Committee.**—Chairman: W L'Estrange. Members: A F McKenzie, R W Smith, G Reddinger, H Rosenbrock, J H Gordon, W Meyer. **Schroeders Sub-Committee.**—Chairman: F Reiche. Members: H Schmidt, E Lindhorst, G Moe, P Rodehorst, H T Rohrs, F Gordon, A Meyer, W Fortmann.

NQUTU.—Chairman: A Barklie, Utrecht. Members: H Wilkins, R L Flindt, W A Westbrook, J W F Hall, Dr. Knight.

PAULPIETERSBURG.—Chairman: N J Els, Viljoen's Rust. Members: J B Rudolph, G J Combrink, A Schutte, A Bester, P H van Rooyen.

PIETERMARITZBURG.—Chairman: B Swete Kelly, Pietermaritzburg. Members: W S Crart, C A Fawcett, W E Goodwin, E G McAlister, E E Hodgson.

RICHMOND.—Chairman: Magistrate. Members: E E Johnson, J Mapstone, G D Alexander, C P Lewis, C Nicholson, W Comrie, John Marwick, W P Payn, A H Cockburn. **Sub-Division No. 2.**—Chairman: G D Alexander, Nel's Rust. **Sub-Division No. 5.**—Chairman: W Oldfield, Fox Hill.

REIT VLEI DISTRICT.—Chairman: D. E. Muir, J.P., Elsmore, Mooi River. Members: P. Otto, J.P., R. J. Van Rooyen, E. J. Van Rooyen, J. G. Nel, A. Kohrs, J. Hooper, Otto Norton (Hon. Secretary).

SEVEN OAKS DISTRICT.—Chairman: W J S Newmarch, Harden Heights. Members: H M Bidding, J.P., J Crow, J T Martens, H Mayne, S W Cadle.

UMGENI DIVISION.—Chairman: E. S. Goodwill. Members: F. Schroenn, B. Crompton, C. Arnold, R. J. Potts, A. J. Tyler, F. J. Smith, A. Wood, J. P. Symonds, J. J. Potterill, W. H. Keytel, C. Lund.

UMLAZI.—Chairman: C Henwood, Durban. Members: W Pearce, W Gillett, H Freese, L Jackson, P W Mackenzie.

UMSINGA.—**No. 1 District** (All farms lying West of the Umsinga-Helpmakaar main road).—Chairman: E C Nuss. Members: W W Strydom, J.P., J H Nuss. **No. 2 District**—(All farmers East of the Umsinga-Helpmakaar main road—excepting the farms Sutherland, Gordon, Memorial Mission and Pomeroy Town Lands, and Location lying North of the Mazabeko and West of the Buffalo River).—Chairman: W H Wholberg, P.O. Elandskraal. Members: H W Dedekind, J Dedekind. **No. 3 District**—(The remaining portion of the area lying in the Umsinga Division).—Chairman: A Muller. Members: M J Matheson, H Muller. The three Committees to constitute the joint Committee.

VRYHEID.—Chairman: A von Levetzow, Vryheid. Members: P Labuschagne, B E A Rabe, G M van der Westhuizen, J Kruger, J F Potgieter, L M N Nel.

WEENEN.—Chairman: C G Jackson, Weenen. Members: C Harding, J.P., P J van Rooyen, J.P., K Rottcher, S B Buys, J J Vermaak, L C Kinsman, J W A Pole, C F Vermaak, P R Buys, J C's son.

Publications Issued by the Department of Agriculture.

THE following publications, issued by the Department of Agriculture, are still in print, and copies may be obtained free (except those with price attached) upon application to the office of the *Agricultural Journal*, Department of Agriculture, Pietermaritzburg. The figures in square brackets (*e.g.* [1904]) are the years in which the various publications were issued.

No.

BULLETINS.

- 2.—“Manures on the Natal Market, 1902,” by Alex. Pardy, F.C.S., Analyst. [1902.]
- 4.—“Manures on the Natal Market, 1903,” by Alex. Pardy, F.C.S., Analyst. [1903.]
- 6.—“Manures on the Natal Market, 1904,” by Alex. Pardy, F.C.S., Analyst. [1904.]
- 7.—“Tree-planting in Natal,” by T. R. Sim, F.L.S., Conservator of Forests. [1905.]
(Price 2s. 6d., post free.)
- 8.—“Agricultural Co-operation,” by E. T. Mullens, Secretary, Minister of Agriculture. [1905.]
- 10.—“Manures on the Natal Market, 1905,” by Alex. Pardy, F.C.S., Analyst. [1905.]
- 11.—“East Coast Fever,” by S. B. Woollatt, Principal Veterinary Surgeon. [1906.]
- 12.—“Manures on the Natal Market, 1906,” by Alex. Pardy, F.C.S., Analyst. [1906.]
- 13.—“Report on the Disease known as ‘Bluetongue’ in Sheep,” by H. Watkins-Pitchford, F.R.C.V.S., F.R.S.E., Govt. Bacteriologist and Director, Govt. Laboratory. [1908]
- 14.—“Poultry-Keeping in a Simplified Edition for Farmers,” by F.C. [1908.]
- 15.—“The Export of Citrus Fruit,” by Claude Fuller. [1909.]
- 16.—“Some Common Bagworms and Basketworms,” by Claude Fuller. [1909.]
- 17.—“Dipping and Tick-Destroying Bacteriologist and Director, Govt. F.R.C.V.S., F.R.S.E., Govt. Agents,” by H. Watkins Pitchford, Laboratory. [1909.]

REPORTS.

Annual Report of the Agricultural Department, 1902. (Includes Reports of the Director of Agriculture, Entomologist, Conservator of Forests, Dairy Expert, Editor *Agricultural Journal*, etc.) [1903.]

Report of the Secretary, Minister of Agriculture: January 1, 1903, to June 30, 1904. [1905.]

Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1905. [1905.]

Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1906. [1906.]

(For a continuation of the statistics given in these reports see reprint “Natal's Progress in 1906,” noted below.)

Fourth Report of the Government Entomologist: 1903-4. [1905.]

Fifth Report of the Government Entomologist: 1904-5. [1906.]

Sixth Report of the Government Entomologist: 1905-6. [1907.]

(The Third Report of the Entomologist is included in the "Report of the Agricultural Department, 1902," noted above.)

Report of the Conservator of Forests, 1902. [1903.]

Interim Report of the Conservator of Forests up to December 31, 1905.

Report of the Principal Veterinary Surgeon, for year ended 30th June, 1906. [1907.]

First Annual Report of the Land Board, 1905. [1906.]

Annual Report of the Land Board, 1906-7.

MISCELLANEOUS REPRINTS, ETC.

Black Spot ("Letter Book Pages": reprinted from *Journal*.)

Mealie Grubs (do do)

Mosquitoes (do do)

Woolly Aphis (do do)

Cotton. By A. N. Pearson, Director, A. E. & C. (Reprinted from *Journal*: 1904.)

Co-operation. By E. T. Mullens, Secretary, Minister of Agriculture. (Reprinted from *Journal*: 1907.)

Citrus Fruit Export. (Reprinted from *Journal*: 1907.)

Natal's Progress in 1906. (Reprinted from *Journal*: 1907.) The statistics contained in this paper are on the same lines as those in the Annual Reports for previous years of the Secretary, Minister of Agriculture.

Natal's Progress in 1907. By H. J. Choles, F.S.S. (Reprinted from *Journal*: 1908.)

Natal's Progress in 1908. By H. J. Choles, F.S.S. Reprinted from *Journal*: 1909

Fibre Cultivation. (Reprinted from *Journal*: 1907.) This paper is a summary of Bulletin No. 13 of the Department of the Interior, Bureau of Agriculture, Manila.

Sisal, Mauritius Hemp and other "Aloe" Fibres. By T. R. Sim, F.L.S., Conservator of Forests. (Reprinted from *Journal*: 1907.)

The Fibre Industry of Mauritius. By Leonard Acutt, J.P., Tongaat; Member of the Land Board, Natal. (Reprinted from *Journal*: 1907.)

South African Products Exhibition, 1907. Report of T. R. Sim on the Natal Exhibits. (Reprinted from *Journal*: 1907.)

Poplar Timber for the Local Manufacture of Matches. By E. R. Sawyer, Director, E.S. (Reprinted from *Journal*: 1908.)

Agricultural Industries and Land Settlement in Natal. [1907.]

Judging Fruit, Flowers, Plants and Vegetables at Shows. By T. R. Sim, F.L.S., Conservator of Forests. [1906.]

Agricultural Statistics, Natal, 1905-6. [1907.]

Model Rules for Agricultural Co-operative Societies. (Price 1s., post free.)

Almost anybody would get sick and tired of the same things to eat the whole year round. The horse does, too. Vary this ration by giving him a nice little warm mash, not too thin, once in a while. It will help to keep his bowels regular; and taste good, too.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

Charges, in respect of Cattle and the Meat of Cattle.	Calves up to one year old.	Cattle over one year old.		
		Rate per single head.	After reaching 100 head in month.	
<i>Abattoir.</i>				
	s. d.	s. d.	s. d.	
1. Receiving, per head... ..	0 3	0 6	0 3	
2. Killing and Dressing, per head	2 0	3 6	2 9	
3. Disinfectants	0 1	0 1	0 1	
4. Cleaning Tripes, each	0 6	0 6	0 6	
5. „ Sets Feet, per set	0 6	0 6	0 6	
6. „ Calves' Heads, each	0 9	—	—	
<i>Bagging Charges.</i>				
1. Per Body of Beef	1 3	2 6	1 9	
2. Bagging Labour, per body	0 3	0 6	0 3	
Hessian, 3d. per yard.				
<i>Special Storage Rates for Chilling up to 72 hours.</i>				
1. Chilling Beef, per body	1 3	2 9	1 9	
2. Chilling Offal, per set	0 6	1 0	0 6	

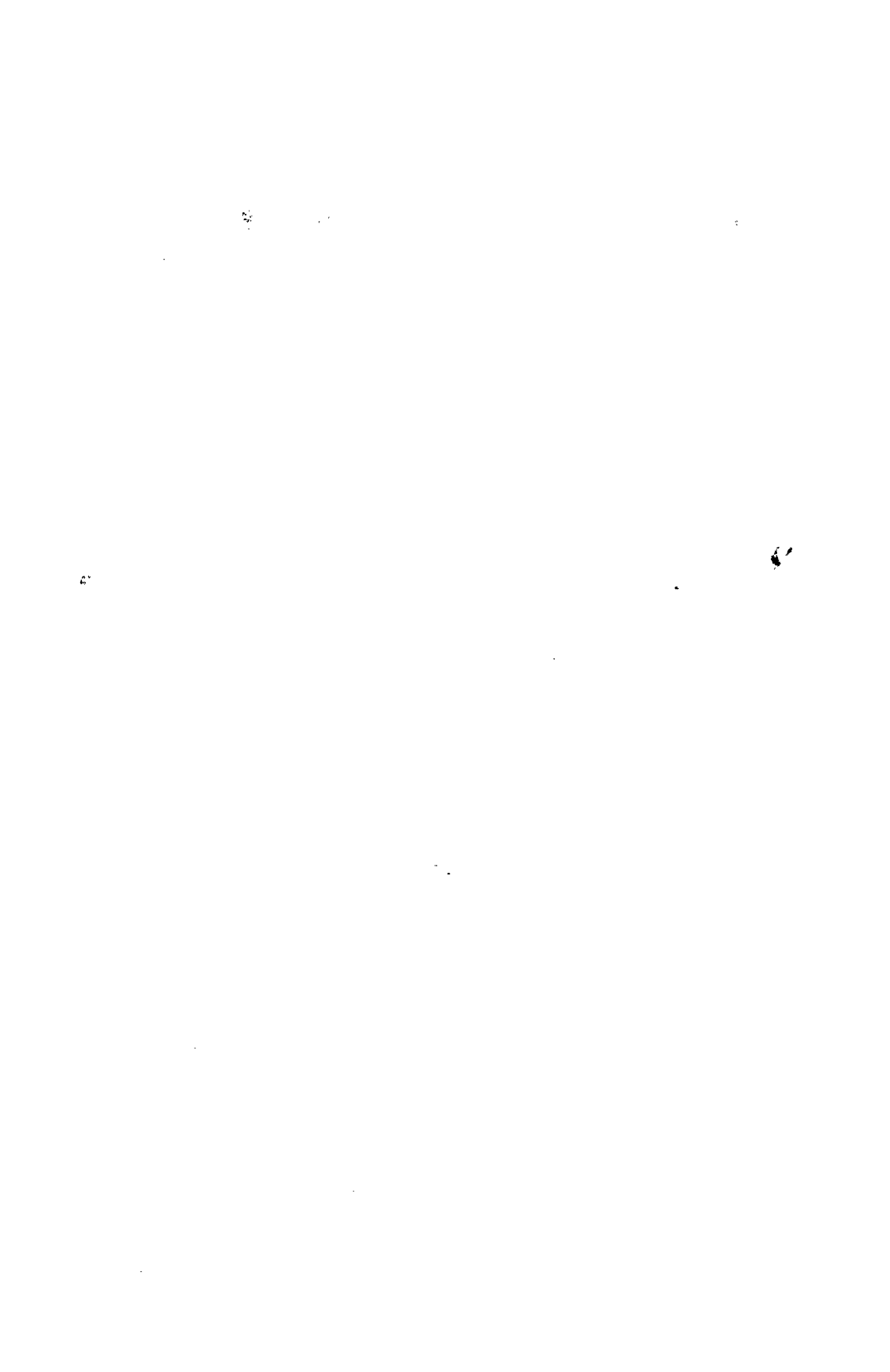
A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars apply to the Manager, Government Cold Stores.
Department of Agriculture, Maritzburg, 21st December, 1908.

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the Fund, Colonial Offices, Pietermaritzburg.

All Correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.





The Hon. W. A. Deane.

Natal's last Minister of Agriculture before Union.

The Natal Agricultural Journal.

The End of the Old Regime.

THE last of Natal's Ministers of Agriculture under Responsible Government has gone. At the moment of writing, the Hon. W. A. Deane is on a visit to England and Colonel E. M. Greene, Minister of Railways and Harbours, is acting in his stead as Minister of Agriculture; but by the time these lines fall under our readers' eyes the Portfolio of Agriculture, as the Portfolios of other branches of the Administration, will automatically have ceased to exist, and Natal will have become constitutionally a Province of United South Africa.

Facing this page is a portrait of the last of Natal's Ministers of Agriculture, the Hon. W. A. Deane, M.L.A. Mr. Deane was the fifth—or, strictly speaking, if we include Sir Henry Binns, who joined, for the space of a month or so only, the office of Minister of Agriculture with that of Prime Minister, the sixth—Minister holding the Portfolio of Agriculture since the granting of Responsible Government in 1893. His predecessors, named in the order in which they held office, were: Mr. Edward Rley, 1897-98 (Member for Klip River); Mr. F. A. R. Johnston, 1898-99 (Member for Newcastle); the Hon. H. D. Winter, 1899-1903 (Member for Weenen); and the Hon. W. F. Clayton, 1903-1906 (Member for Victoria County). Portraits of these gentlemen will be found elsewhere in this issue. The present, we think, will be a fitting occasion, as the last issue of the *Journal* under the old Constitution, to outline, however briefly, the terms of office of each of the gentlemen who have served Natal in the capacity of Minister of Agriculture, and to refer to the chief events which took place during the time they held office, as well as to give a few brief particulars of the political life of each of these gentlemen. We begin our survey with the gentleman who first held office exclusively as Minister of Agriculture, namely,—

MR. EDWARD RLEY.

Mr. Rley entered the arena of politics of 1890; he was returned in that year as member of the Legislative Council for Ladysmith. He and Mr. John Bainbridge stood on the Responsible Government platform, the defeated candidates being Sir Thos. K. Murray and Mr. W. C. Bester. In 1892 he and Mr. Bainbridge were again returned; Mr. G. F. Tatham

and Mr. Ignas de Waal were the unsuccessful opponents. In the year following there was another election, and Mr. Ryley was again returned, having for colleagues Mr. Bainbridge and Mr. H. Smith.

For some time—until the abolition—Mr. Ryley was a member of the Council of Education. Mr. Ryley was chairman of the 1894-5 Stock Commission, on the recommendation of which the present Veterinary Department was established. To this Commission was also due the Lung-sickness Act of 1897.

In February, 1897, Mr. Ryley, at the invitation of the late Mr. Escombe, joined the Administration as Minister of Agriculture. All the energies of the Department at that time were directed to the keeping of rinderpest out of the Colony. The efforts were unsuccessful. The first case occurred amongst some Kafir cattle near Dundee. The several herds were killed and paid for. The next case occurred at Mr. Field's farm, near Ladysmith, and other cases broke out almost simultaneously in different and widely separated parts of the Colony. It was then decided that the destruction of herds would not be practicable, and, on the advice of Mr. Watkins-Pitchford, inoculation with bile, until serum could be obtained, was introduced. Mr. Ryley immediately took steps to get salted cattle both from the Orange River Colony and the Transvaal. Unfortunately, owing to the season being midwinter, the cattle were in poor condition, and could not be held for a considerable time.

At the election of 1897 Mr. Ryley was rejected by the Ladysmith electorate. He then took a three years' holiday to England.

During his term of office, the whole attention of the Department being centred on rinderpest, Mr. Ryley could devote barely any time to other agricultural needs. The officers of the Department were then engaged from early in the morning till late at night. The expenditure amounted to £176,000; in the Cape Colony the corresponding expenditure was £1,744,000. These figures will roughly indicate the immense pressure of responsible work that must at that time have fallen on the shoulders of one in the position of a Minister of Agriculture.

Mr. Ryley's father was a farmer and miller in England, and he himself, until he came as a young man to Natal, was engaged with his father in farming. In Natal Mr. Ryley's occupation has been that of miller and timber merchant.

MR. F. A. R. JOHNSTONE.

Mr. Ryley was succeeded by Mr. F. A. R. Johnstone, who at the time represented the Newcastle constituency.

A good many years have elapsed since Mr. Johnstone first entered public life. In 1867 he was elected member of the Transvaal Volksraad for the Wakkerstroom District. His colleague was the late Commandant-

General P. J. Joubert. In 1879 he was appointed a Member of the Legislative Council under the Administration of the late Colonel Lanyon. In 1882, on the retrocession of the Transvaal, Mr. Johnstone removed to Natal. In 1890 he re-entered public life as Member of the then Legislative Council for Newcastle. His platform was that of the "Responsible Government" party. For eleven years he was a representative of the Newcastle constituency in Parliament. In 1898 he joined the Binns Ministry as Minister for Agriculture. During his term of office the Veterinary and Mines Departments were made directly responsible to the Minister; a new Mines Law and Regulations was drafted and passed into law, investigation work in diseases of stock, especially horse-sickness, lung-sickness, and rinderpest, was taken in hand, and the epidemic of rinderpest brought to an end. During Mr. Johnstone's term of office the *Agricultural Journal* was started. Mr. Johnstone retired from office in February, 1899.

THE HON. H. D. WINTER.

The third Minister of Agriculture was the Hon. H. D. Winter. Mr. Winter is Colonial born and was educated at the old High School, Maritzburg. After leaving school he was with Messrs. A. Fass & Co. for many years, where he received a commercial training. In 1870 he went to the Diamond Fields for that firm, and returned to Maritzburg in 1871. He then purchased transport plant, and continued transport-riding until 1882. During that period—in 1875—he started stock and agricultural farming in Weenen County, and since then he has taken a keen interest in stock of all kinds, and in agricultural shows. He was for many years a Field Cornet for the county. In 1889 he was appointed Justice of the Peace. On the change of Government in 1893 he was returned to Parliament as a representative for his county. Amongst his first attempts at legislation was an endeavour—unsuccessful—to get the imposing of a tax of 20s. on Natives leaving the country for work. In February, 1899, as Minister of Agriculture, he joined the Binns Ministry, and in June of the same year, on the death of Sir Henry Binns, he joined the Hime Ministry. At intervals, in addition to his own particular duties, he temporarily occupied other Ministerial positions—the Ministry of Native Affairs during the absence of the Hon. F. R. Moor, M.L.A., in Australia, and for several months he acted as Colonial Treasurer.

During Mr. Winter's administration much was done to forward the agricultural interests of the Colony; bacterial research was advanced, inoculation against rinderpest was made compulsory, the Tuberculosis Act was passed, the Glanders Act was amended in the matter of compensation, a Proclamation was issued under the Contagious Diseases Act of control the importations of stock, experimental farms were started,

forestry was taken in hand, refrigeration cars were placed on the railway, irrigation on an extensive scale was begun, and cold storage was established—to mention the leading innovations which took place.

THE HON. W. F. CLAYTON.

In 1903, Mr. Winter was succeeded by the Hon. W. F. Clayton. Mr. Clayton was born and educated in London, coming to Natal in 1876. Almost since his arrival in the Colony he has been associated with politics, and in 1901 he was elected to the Legislative Assembly. Among the more important features of his Ministerial work mention may be made of the following:—Opening out of the Central Experiment Farm from its second year; erection and opening of the Cedara School of Agriculture; starting of stud stock at Cedara; obtaining co-operation of neighbouring Colonies with regard to the destruction of locusts; passing of Plants' Diseases Act, Burrweed Amending Act, East Coast Fever Act, Scab Amendment Act, Agricultural Development Act, etc.; the institution of the Land Board; opening up of Winterton—30 settlers; opening up of land in Zululand—some 170 farms allotted—and arrangements concluded for central sugar mill; arrangements made for curing tobacco at Weenen; prosecution of Natal's part in the South African Products Exhibition in London in 1907; holding of East Coast Fever in check until the rebellion caused quarantine regulations to be broken through.

On retiring with the Smythe Ministry in November, 1906, Mr. Clayton was presented with an address from the Staff of his Department warmly acknowledging the cordial relations which had existed during his tenure of office.

THE LAST MINISTER.

Such are the leading features of the Ministerial work performed by each of the successive holders of the Portfolio of Agriculture up to the time when Mr. Deane took office. Of Mr. Deane's work it is impossible at the present time to form a just estimate: it is all too recent to enable one to gauge its importance and its influence upon the agriculture of the Colony. A bare enumeration of the leading features of his work may, however, be made without any attempt at gauging the effects which such work has had upon the Colony.

To say that farming in Natal has made very substantial progress during Mr. Deane's term of office as Minister of Agriculture is to make no more than a very moderate statement of fact. Taking up the reins of office in November, 1906, Mr. Deane early occupied a place of distinction in the public eye by taking in hand during that season the question of organising an export trade in maize. The indications that season were for a crop considerably above the average, and recollecting how in-



Sir H. Binnis.



Ed. Ryley, Esq.



F. A. R. Johnstone, Esq.



Hon. W. A. Deane.



Hon. H. D. Winter.



Hon. W. F. Clayton.

NATAL'S MINISTERS OF AGRICULTURE
Under Responsible Government.
(See Leading Article in present issue).

former years the price of mealies in this country had been dependent upon the size of the crop and how an extra large crop meant proportionately smaller returns for the farmer and not, as is the case in an economically sound country, larger returns, Mr. Deane set himself to ensure that farmers should secure returns proportionate to the size of their crop and to encourage mealie growing in this country by organising an oversea export trade in this staple. He approached the shipping companies, and was able to make them see the desirability of lowering their freight rates in regard to mealies in order to encourage a young industry, and he was also instrumental in securing the establishment of an "export" rate on the Natal Government Railways. A grading officer was appointed to examine and grade at the port all mealies intended for shipment oversea, and gradually the machinery for an export trade was got into working order and then handed over to the Railway Department. The example of Natal has been followed by the other Colonies of South Africa, and a grain trade has been established on a scale the like of which has never before been seen in South Africa, and which gives promise of increasing to an enormous extent in the near future. Last year the exportation of mealies brought into South Africa fresh wealth to the extent of over £650,000. It was at the time of the establishment of the maize export that the Commercial Agency was established in London with Mr. C. W. F. Harrison in charge. Turning from his successful endeavour to organise an export trade in maize, Mr. Deane next devoted his attention to fruit and lamb, whilst he also interested himself during the latter portion of his term of office in an endeavour to create an export trade in Kafir corn. With the results of the attempts which have been made to establish a trade with England with fruit and lamb all regular readers of this *Journal* are acquainted. In both cases Mr. Deane's efforts have shown what Natal is capable of doing and also what is perhaps a little beyond her at the present time, and if they have not resulted in an export trade in these two commodities being placed on as successful basis as that of maize it has not been the fault of Mr. Deane and his helpers. In East Coast Fever Mr. Deane found an evil which troubled the Colony from the day he took office until the day he left. He has been subjected to a great deal of criticism because he was not able to prevent the disease from spreading, but all such critics overlook the disability under which he had to fight the disease in that he was unable, by reason of the straitened nature of the Colony's finances, to obtain sufficient money to enable him to undertake a campaign against the disease sufficiently comprehensive to ensure success. Under this disability Mr. Deane did his best, and he went further than simply to endeavour to stay the course of the disease, by giving assistance to farmers who were suffering

through the ravages of the disease among their herds. This assistance took the form of the sale, upon easy terms, of mules, donkeys and sheep to farmers, the rendering of financial assistance for the purpose of fencing farms and the erection of dipping tanks, of the purchase of cattle from infected herds at a reasonable figure in order to insure farmers against heavy loss, and by the purchase of steam ploughs for the purpose of helping farmers who had lost their cattle to plough their lands. These are the chief directions in which Mr. Deane endeavoured to assist farmers who were in danger of loss through the ravages of East Coast Fever, and it is probably due to Mr. Deane's efforts in this direction that the effects of East Coast Fever upon farming in the Colony have been relatively unnoticeable. Another great direction in which Mr. Deane has done his utmost to secure for Natal a larger white population, and many fresh areas of good farm land have been opened up both in Natal and in Zululand. As some indication of what Mr. Deane's efforts have resulted in, it may be mentioned that 530 fresh settlers have been put on the land during his term of office.

Such are the chief directions in which Mr. Deane's energy as Minister of Agriculture has been turned; and, before concluding, mention may be made of the beginning which has been made during his term of office in the introduction of primary agricultural education into Government schools. Also it should be mentioned that research work in connection particularly with blue-tongue, horsesickness and East Coast Fever has continued, with every encouragement from Mr. Deane, and that the School of Agriculture at Cedara has grown very considerably during his term of office.

Natal is now entering upon a new era—an era, all are convinced, of progress and prosperity. General Botha has been selected as the first Union Prime Minister, so that, with such a leader—a leader who has already achieved distinction by the sympathetic and progressive manner in which he has directed the agricultural affairs of the Colony of which he has been Prime Minister and Minister of Agriculture—Natal and the Union as a whole should make very rapid and substantial progress under the new scheme of things which comes into force with the beginning of June.

An abstract of a paper in the *Experiment Station Record*, Vol. XXI., No. 2, of the United States Department of Agriculture, shows that naphthalene may be used with success for the purpose of protecting grafts and cuttings from the attacks of the larvæ of insects. It is also stated that vaporite has given good results when employed for that purpose.

The Maize Crop in April.

PROBABLE CROPS—645,000 MUIDS.

THE decline in the condition of the maize crop which we noted last month continued during April, and on the 30th April, according to the reports we have received, the general condition for the whole Colony was 2·27, as compared with 2·38 on March 31st. The March condition was representative of a crop averaging 4·1 muids; the yield according to the condition reflected by the figures for 30th April is now likely to be not more than 4 muids—3·91, to be more exact.

The following figures show that the crop this year is behind that of last year, so far as condition is concerned: the statement gives the average condition and the corresponding yield per acre in muids at the end of each month up to date, for this season and for last year; and we also continue last year's figures up to the end of the season, in order that readers may see what condition our crop has to arrive at before the possibility of last year's yield per acre is arrived at:—

At End of—	Condition	Yield	Condition	Yield
January	2·0	3·44	3·1	5·34
February	2·52	4·34	3·0	5·16
March	2·38	4·1	2·69	4·63
April ... ..	...	...	2·7	4·65
May ... ..	...	...	2·64	4·54
June ... ..	...	...	2·82	4·86

Appended will be found a table showing the progress or otherwise that the mealie crop is making in the various Magisterial Divisions of the Colony. In studying these figures it should be remembered that the four "conditions," "poor," "fair," "average," and "above the average," are represented by the figures 1, 2, 3 and 4, respectively, and that intermediate figures represent intermediate conditions.

THIS SEASON'S ACREAGE.

We are now in a position to give our readers some idea as to the acreage planted this season. We cannot give exact figures, but have made an estimate on reports from 75 per cent. of the farmers of the Colony, which we think will turn out to be approximately correct. Last season's acreage would appear to have been actually about 164,500 acres; this season we estimate that practically the same area has been planted—namely, about 165,000 acres.

Normally, of course, this season's acreage would have shown a considerable increase over that of last year, in view of the tendency there is to go in more and more for maize cultivation; but as we remarked in a previous article the unfavourable weather conditions in the spring, together with the difficulty of getting sufficient animals for ploughing as a consequence of East Coast Fever, restricted the area put under this crop. Indeed, we are surprised to see that the area is even as large as that of last season.

But whilst the acreage is practically the same as that of last year, the condition of the crop is not as good—the promised yield at the end of last month being about three-quarters of a muid per acre less than at the same time last season. We estimate the crop for this season, according to *present* conditions, at

645,000 MUIDS,

as compared with a promised crop of 770,000 muids at the same time last year. The actual crop last year was 800,000 muids. We hardly think there is much chance of improvement in the prospects of this year's crop: in fact, so late did planting necessarily take place in some of the districts that there is a likelihood that an appreciable percentage of the crop will be carried off by frost before reaping time is over.

CONDITION OF CROP.

(Note.—A condition "above the average" is represented by the figure 4; "average" by the figure 3; "fair" by the figure 2; and "poor" by the figure 1: intermediate figures represent corresponding conditions.)

Division	Condition of Crop at end of—				
	January	February	March	April	
				This Year	Last Year
Lower Umzimkulu ...	3'2	3'0	3'0	1'50	2'5
Alexandra ...	2'5	2'7	2'4	2'60	3'0
Umlazi ...	3'0	2'0	2'0	2'0	2'0
Inanda and Indwedwe ...	3'2	3'0	3'4	3'0	3'0
Lower Tugela and Mapumulo ...	2'4	2'5	2'5	2'50	3'0
Impendhle ...	1'0	1'2	2'0	1'50	3'0
Alfred ...	2'5	3'0	2'5	1'67	3'0
Ixopo ...	2'7	2'7	2'8	2'5	2'75
Richmond ...	2'2	2'4	2'4	2'28	2'0
Umgeni ...	2'4	2'4	2'1	2'14	3'4
New Hunover ...	2'4	2'4	2'4	2'59	3'0
Lion's River ...	1'8	1'8	2'3	1'82	3'0
Umvoti ...	2'2	2'5	2'5	2'29	3'4
Krantzkop ...	2'8	2'8	3'0	2'75	3'0
Underberg ...	1'0	1'0	3'0	1'0	3'0
Polela ...	1'0	2'0	1'5	2'0	4'0
Bergville ...	1'8	2'6	2'8	2'75	2'4
Estcourt ...	1'9	2'3	2'2	2'15	2'7
Weenen ...	1'6	2'0	1'7	1'67	2'0
Klip River ...	2'0	2'2	2'1	1'79	2'0
Umsinga ...	2'6	2'0	2'3	2'0	2'0
Dundee ...	2'2	2'5	2'8	2'23	2'0
Newcastle ...	2'2	2'4	2'4	2'0	2'3
Vryheid and Ngotshe ...	2'6	3'2	2'3	3'0	1'0
Utrecht ...	2'5	2'3	2'0	2'0	3'0
Paulpietersburg ...	4'0	3'4	2'5	4'25	...
Babanango ...	3'0	3'0	2'0	1'0	1'0
Eshowe and Intunzini ...	2'5	3'0	2'0	2'0	2'0
Entonjaneni ...	3'0	2'8	2'6	2'67	3'0



The "Laboratory" Dip.

THE following letter has been received by the Government Bacteriologist, Mr. H. Watkins-Pitchford, from Mr. Thomas Morton, of "Ashley," Howick Rail, and has been handed to us for publication, as it is thought that Mr. Morton's experiences with the "Laboratory" Dip will be read with interest by cattle-owners in all parts of the Colony. Mr. Morton has made reference in his letter to certain firms—local merchants and dip manufacturers—whose names we omit in justice to the firms concerned. Mr. Morton writes:—"You may remember my calling at your office in December last with a bottle of liquid and telling you that I had started to dip, using your 'Laboratory' Dip, and that I found it was not satisfactory as the ticks were worse since I started using the dip. You told me to get arsenite of soda from ——— as you had had several complaints against the arsenite of soda supplied by ———. I acted upon your advice at once by emptying the tank and re-filling with the arsenite of soda from ———, but unfortunately I had only dipped once when the tank burst and I had to have the tank destroyed and re-built, which took some time. During the re-building I continued spraying with your 'Laboratory' Dip as I had to be most careful, having the tick fever on two sides of my farm, as well as amongst the cattle belonging to Natives who live on a part of my farm, these Natives going home from work every night.

"Well, I have been dipping in the new tank since the middle of February," continues Mr. Morton. "I use your 'Laboratory' Dip and put the cattle through the tank every fourth day; when Sunday falls on the fourth day I dip on the Monday. I use thick brick oil, 20 parts, with 1 part of Stockholm tar and 1 part of paraffin, mixed, and paint with the hand inside and outside the ears, the hair between the horns, under the tail, and where the brush of the tail used to be; and I am delighted to be able to tell you that when the cattle are being put through the dip I examine a great number most carefully and cannot find a single tick

anywhere except now and again one or two under the tail, but on no other part of the body.

"I think it is my duty," Mr. Morton concludes, "to write and thank you for the excellent and cheap dip you have given to the Natal farmers. Although I have often heard that one cannot use your 'Laboratory' Dip oftener than once every five or six days, I dip every fourth day and put my oxen into the plough same day after dinner, with no bad results either to milking cows or to oxen. I do all the mixing of ingredients myself. I ought to tell you that for ten months previously I had been spraying with ——'s and ——'s dips and they are not to be compared with your dip. My neighbour, ——, is losing very heavily just now.—Again thanking you for the excellent dip, I remain, etc.—THOMAS MORTON."

South African Pines in London.

In a memorandum dated 21st April the Natal Commercial Agent in London, referring to South African fruit in London, states that there was a small number of cases of Cape pines on the market, which, repacked, realised 6s. to 7s. a case of one dozen. The size, he adds, is still small. Mr. Harrison regrets that Natal senders have not made experiments this season, as there was a prospect of good sales being effected. The Paris market is also enquiring for South African pines of good quality. He says that the best time during which to ship pineapples (of first-class quality in all respects) is between November and May. "Good prices can be relied upon, but as I have repeatedly urged, Natal should endeavour to set a standard for quality and size."

Mango Culture.

Mr. H. H. Cousins, Director of Agriculture for Jamaica, gives the following useful hints on the culture of the mango:—The mango, when grown naturally from seed, sends down a deep tap root, and it is characteristic of young seedling mangoes that they root very deeply in the earliest stage of their growth. Experiments have shown that a good seed from a strong-growing variety (planted at stake) will give far quicker results in establishing a tree than a seedling set out from a pot. Indeed, in a dry district, the establishment of a mango transferred from a pot to the soil is always a matter of considerable uncertainty. It is desirable, therefore, when setting out an orchard, to plant seeds of the yam or other strong variety of mango. When these are one and a half to two years old they should be stout trees of just the right size for budding. A distance of 30 to 40 feet should be allowed between the trees when developed.

For quick returns from budded trees it is recommended to plant 15 feet by 15 feet or 20 feet by 20 feet, and to cut out every alternative tree when the growth requires it. With the mango, the young buds are not of use for budding. The buds from wood one and a half to two years old, showing leaf scars on the bare bark, should be selected. It is useless to attempt budding unless the bark lifts freely. When the trees are flushing, the bark can be lifted easily, and there is no difficulty in removing the buds with the slips of excised bark. Buds can be inserted either by cutting out a corresponding piece of the branch to be treated, or the bud can be slipped under a T-shaped incision in the ordinary way. Raffia fibre is a good medium for tying the buds.

In budding old trees, do not cut down the whole tree at once. The main branches should be cut off about a foot from the stem, care being taken not to split the arm, smoothing the edge of the bark and protecting the cut surface with tar. When the new growth is one to one and a half inches in diameter it is fit to take a bud. When the buds have started to grow the rest of the branches can be cut down and similarly treated. It is important to observe that an old tree cut off short below the main branches will probably die, and that care is required in lopping old trees not to remove the whole of the foliage at one operation. When the new shoots have grown, the old stumps of the original branches should be carefully cut close back with a slope toward the trunk of the tree. It is very important in pruning a mango tree to cut close to the main branch or stem so that the wound can heal rapidly. The bark should be bevelled with a sharp knife and the cut end treated with tar. Careless lopping of old trees will result in attacks of insects and fungi upon the exposed tissue, and the death of the trees will be greatly hastened.

The Cyclone Tractor.

Readers of the *Journal* may be interested to know that Mr. Dudley de Ros, of this Colony, has been in England for some months arranging for the formation of a company to be called the African Union Transport Company, Limited, for the purpose of placing Cyclone Tractors on the road in South Africa to deal with the accumulation of traffic at the rail-heads and also for the purpose of taking contracts for ploughing and hauling for farmers. The following is a description of the Tractor:—The 25-H.P. "Cyclone" agricultural tractor (1910 model) has driving wheels 5 feet in diameter by 9 inches broad, and the leading wheels 3 feet 6 inches in diameter by 6 inches broad. The wheels are of best toughened annealed steel, bushed with soft cast iron of special quality.

The threads of the wheels are fitted with trod plates and with special spuds, which overhang the side of the wheels by 6 inches, and practically make the surface of the wheels 15 inches when the tractor is going over soft ground. The gear box is suited to the requirements of ordinary farm hands and men who have never driven a high-speed oil engine before. There are two speeds forward and two speeds reverse, three and six miles an hour. The two sets of gear wheels are always in mesh and are brought into operation by means of a patent double clutch, and we are informed that it is impossible for the merest beginner to damage the teeth of the gear wheels by banging the different speeds into mesh. The reverse is obtained by two bevel wheels which are always in mesh with the bevel pinion.

The engine has two cylinders with a bore of $5\frac{1}{2}$ inches and $6\frac{1}{2}$ inch stroke, the normal number of revolutions being 1,000 a minute. The crank chamber is of cast iron and is fitted with inspection doors on each side. Three large gun-metal bearings lined with anti-friction metal support the crank shaft, which is turned out of chrome vanadium steel and made hollow for purposes of lubrication. In order to enable the engine to be started up easily, a half-compression gear is fitted which acts on the exhaust cam-shaft. A low tension Bosch magneto is fitted in an accessible position on the front supporting arm of the engine on the inlet side. A forced feed system of lubrication is installed on the engine. Both of the cylinders and valves are well surrounded by water jackets, which extend down below the lowest point reached by the pistons. The engine is fitted with a carburettor for the consumption of common paraffin, but if required this can be altered to consume either alcohol or petrol. The engine and gear-box are enclosed in dust-proof cases. It has been thought advisable to fit a drum for pulling the engine out of boggy places or river beds when it gets stuck in crossing streams. The tractor will, it is stated, cross rivers with a good hard bed when the water is not more than 3 feet in the deepest place. The whole tractor has been produced with a view to absolute simplicity of manufacture and working, and anyone can learn to drive after a day's practice. The London price of a 25—30 h.p. tractor is £425.

The Value of Wool-Sorting.

Dr. Pringle, of the Natal Government Asylum, has sent us some interesting particulars of the efforts which Messrs. Pringle Bros., of Bedford, Cape Colony, are making to improve the status of the sheep and wool industry of South Africa. Messrs. Pringle Bros. confine themselves to the pure Rambouillet sheep, and do not cross. They have been steadily working up a type of Rambouillet and have now probably the purest

general flock of Rambouillets in South Africa. They import rams and ewes from the Imperial flock near Paris; and they sell stud and flock rams all over South Africa. Messrs. Pringle Bros.' efforts, however, are not being confined to sheep-breeding. They are also endeavouring to show the advantages to be derived from a careful sorting of wool clips prior to shipment. We published an article on this same subject some months ago in the *Journal*, in which, readers may remember, we pointed out that, whilst South Africa can produce as good wool as most other countries, we are not realising as good prices as we should for our wool because of our neglect of the vital matter of sorting and classing. As an example, bearing out the truth of this, it may be remarked that recently Messrs. Pringle Bros. sent a consignment of 52 bales of wool to London which realised from 6½d. for locks and pieces to 11½d. for special longwool; and their agents in London, in the course of a letter, wrote:—"We trust these prices will be to your entire satisfaction, and would point out that the five bales special sold at 11½d., after deducting all expenses, means that you have secured a trifle over 10d. per lb. clean, which constitutes a record price for any wool sold in this or adjoining districts this season. Our London friends write that they deem it wise to advise that during the inspection of wools up for sale in London on the 26th ult., it was obvious that Pringle Bros., Glenthorn, clip was of superior nature to that of the other clips on show. It was the remark of several buyers that they wished all South African wools would be classed in this way, and the satisfactory prices obtained for the clip should be an object lesson to our farmers." This is sufficient to show the advantage of care in sorting and classing, in addition, of course, to breeding with a view to improving the quality of the wool. Practical examples like this tell, and we hope that Messrs. Pringle Bros.' success will serve to stimulate farmers in this colony to follow their example.

Queensland Sugar and White Labour.

In connection with our remarks last month on the labour situation in Queensland with reference to the sugar industry, the following extracts from a communication on the same subject sent to his paper by the Brisbane correspondent of the *Louisiana Planter* will be read with interest: "Official figures which have just been issued show that the yield of sugar in Queensland, which practically means the Australian sugar industry, amounted to 133,578 tons during the season just closed, as compared with 151,098 tons in the previous season. This quantity was obtained from 82,692 acres, as compared with 92,219 acres in the previous season. The exact quantity of cane cut was 1,163,000 tons, as compared with 1,433,300 tons. The decrease in the output has about reached bedrock, as all the indications point to a larger area under cane in the coming

season and several seasons following. The yield has been steadily falling, as a result of the disturbances caused by the change from black to white labour—a change that had to be made somewhat rapidly, although although not so rapidly as some of the rabid members of the Labour Party would have desired, the difficulties of the internal management of the industry being nothing to them. Australia, however, has now practically settled down to the new conditions, and any development that takes place will be merely through the aid of white labour, the number remaining of coloured labourers being comparatively small. It is significant, however, that while the Pacific Islander was banished from North Queensland where he worked under a tropical sun, in the scheme for developing the Northern Territory, a tract of country to the north of the centre of Australia, and hitherto neglected, the use of 'some cheaper form of labour' is glibly talked about.

"The most important event of this month was the meeting of the Australian Sugar Producers' Association, a body of growers who have come into existence as a result of the system of small farmers following the dismissal of the kanaka labour. The Association has not long been formed, and the meeting this year was remarkable for the prominence given to the Conference, including an official reception of the delegates by the Chamber of Commerce—all tending to show the recognition of the industry's importance to the community. This is by way of answer to the Labour Party, whose members do not attach much importance to an industry which they consider has to be bolstered up with a bonus in order that it may pay wages to white workers, and for whom a definite scale of wages has to be laid down by Government regulation. . . .

"The supply of labour in Queensland has been fairly good this year, and as time goes on it is not expected that there will be much trouble to get the cane harvested, although the class of labour offering is not always the best, and Australian growers are always haunted by the fear that at a critical period the men in either the fields or the mills will strike, and thus leave them in the lurch. Then again there is the increasing cost of labour. Although the white man will do more work in a day than the kanaka did formerly on wages, the usual plan is to pay by contract, and a statement was recently issued that it cost fully 25 per cent. including the bonus) of the value to harvest the cane. On top of this are the milling and marketing charges. To the working during the season half a million pounds were distributed as wages to cane cutters. The President of the Association just referred to, recently said: 'Let me say that when our Association deals with the labour problem it is with white labour, and with white labour alone, that we are concerned. Other

descriptions of labour have become a negligible quantity in sugar production, and we have not the remotest idea or the slightest wish that any change be made in this direction. Coloured labour belongs to the past, and our sincerest hope is that no attempt will ever be made to revive it in connection with our industry. Our desire is that it may be wholly a white man's industry, and it is this end that we are applying our individual energy and influence.' This sums up the most advanced and modern thought of the smaller and newer growers in Australia."

American Methods in Maize Culture.

In America a yield of 100 bushels of shelled mealies—equivalent to about 33 muids—to the acre is not unusual, though such a crop is a long way from the average taking the country as a whole. In remarking that the achievement of results like this is to be ascribed to cultural methods, the *Rural Californian* gives, in a recent issue, a brief description of the methods which the best growers employ to obtain such high yields. Among these, we learn, are deep ploughing and other treatment that aids to a thorough preparation of the soil: in advance of planting the making of germinal tests by selecting a number of kernels from an ear, and then selecting from them that sprout first and throw out the best stalks; the use of seed from large ears that have a small cob, in no case using kernels within an inch or more from the tips and butts of the ears, and taking pains to discover and throw out all defective or not fully developed kernels on the body of the ear.

"Apply a farm manure dressing broadcast," our contemporary proceeds, "and fertilise with the liberality required by each particular soil. It is a mistake not only in regard to corn [maize] but all other plants to force the roots to make search for food. Light cultivation from time to time as needed after the spears have grown to a half-dozen inches in height. This treatment not only conserves moisture for the growing crop but for succeeding ones. Rotation from corn to some other crop is another. Choice of seed also from the best rows of corn in the field. It is some work to make the germination tests and select the best ears from the rows when large fields are to be planted, but the returns from it will be abundantly compensatory. These or similar methods should be applied in the selection of the seed of whatever plants, and the same culture as far as conditions will permit. In this way only can the best returns be realised. The methods prescribed are especially adaptable to garden vegetables. If followed faithfully there need be none of an inferior quality on the table."

A Method of Propagating Mangoes.

In connection with an article which appears in this number of the *Journal*, on shield budding for the mango, it is worthy of note that, according to *Agricultural News*, an account of another method for the propagation of this plant appears in the *Porto Rico Horticultural News* for February last. It consists in preparing one year old branches of the mango in the way that this is done for the same purpose in the case of carnations; that is, a tongue 3 inches in length is cut in the wood, and a small stone is inserted in order to keep the tongue away from the branch. All that remains to be done after this is to bury the cut part of the branch in soil, in a bamboo pot, which is kept watered. In experiments conducted by the writer, after ninety-six days, two out of six branches had formed roots and were cut from the parent plant. It is stated that a claim is made to the effect that trees propagated by this method yield fruit more quickly than by any other.

The Jerusalem Artichoke.

The Department of Agriculture has been informed by the Acting Agent-General in London that a process has been invented and patented by Professor Stewart, of Murravsville, U.S.A., for the manufacture of levulose, glucose, etc., from the common Jerusalem artichoke (*Helianthus tuberosus*), and for the manufacture of saccharine products which may either be concentrated into syrup or converted into alcohol. In a letter on the subject to the Acting Agent-General Captain Kerr, V.C., who is interested in the matter, says:—"These tubers can be used in a fresh condition as taken from the ground, or they may be dried after being sliced or ground to pulp. If left in the ground after the stalks are ripe they keep for long periods and do not suffer from frost. The stems are useful for paper-stuff. Hitherto these tubers have been only used as cattle food, and as garden produce, for the table, but can be grown to great advantage as a main crop. Levulose ranks next to cane sugar in value as a commercial product. We shall find this tuber a very useful rotation crop and it should grow well in Natal. They are excellent for the dairy."

Entry of Bark and Fruit Packing into Cape Colony.

The Department of Agriculture has been advised by the Minister of Agriculture, Capetown, that ground and chopped wattle bark will not be admitted into the Cape Colony from Natal; and, further, that consignments of fruit packed in other material than paper, paper shavings and wood wool will not be allowed entry. Senders of fruit, plants, and trees are particularly warned against the use of moss, hay, or grass in packing consignment for any destination within or beyond the Colony.



Photo by /

THE DAWN OF A NEW INDUSTRY.

/ A. Moss, Dundee.

Group of Ostriches on Mr. Viljoen's farm, Dundee. In an early issue Mr. Viljoen will contribute an article on the ostrich industry, in the course of which he will give some useful advice to the intending purchasers of birds. Mr. Viljoen strongly advises all who may be thinking of going in for ostriches to purchase only young birds, about 18 months and not more than two years old (unless of course a man may have considerable capital and desires to go in for breeding immediately). His reasons he will explain fully in the article he is preparing.

The Advance of Agriculture.

By W. C. MITCHELL, Acting Manager, Central Experiment Farm, Cedara.

THE gradual evolution of agricultural practice in a country such as this would appear to follow more or less well defined lines. The early history of the soil's production reflects a pastoral type of farming; scanty population permits of large areas coming under single ownership; the lack of railway facilities and adjacent markets precludes the possibility of any development of the latent resources of the soil's fertility, and the "man on the land" is, therefore, by force of circumstances, a pastoralist. Such produce as can be walked to market is the principle agricultural staple, and the annual wool sale is looked upon, in the sheep districts, as a red letter day in the calendar, when a long trek and a considerable amount of bargaining often results in an exchange of the wool for a supply of household necessities calculated to meet all requirements till the next event of a similar nature.

Imperceptibly a change occurs, and increase of population brings with it a demand for land, which is partly met by sales of portions of former large estates or ranches; in addition, the increased population provides a corresponding increase in the amount of traffic. Material is required for the establishment of new homesteads and for the further development of occupied lands; this, therefore, sees the birth of the transport rider or carrier. With these increased facilities for carrying goods to market a gradual change occurs through bringing under cultivation limited areas of previously unbroken ground. By degrees the output in this direction begins to balance the demand until the necessarily high freight charges, incurred through existing means of transport, begets a need for some quicker, cheaper and more certain method of marketing produce, some of which, at least, is of a totally or partially perishable nature. The advent of railway facilities marks the commencement of a new era in agricultural activity. The districts immediately tapped by the rail constitute agricultural districts, whilst from these to the farthermost inland portions of the State, forming the truly pastoral or stock-raising localities, may be found a gradual merging from intensive agriculture to that of a less perfect nature.

Variations of, or exceptions to, the above, may be caused by various factors. The advent of a virulent stock disease—East Coast Fever to wit—which has decimated the country's cattle, exercises an influence towards the substitution of tillage for grazing as the only remaining means of obtaining a livelihood from the land in some districts.

It is not, however, with the advent of the "iron horse" that our tale of agricultural evolution ends. In agriculture, as in everything else, evolution is silently, slowly and surely at work, from the beginning to the end of all things. Competition is often the cause, and evolution the effect. The survival of the fittest militates towards the production of a better type. The *selection* of the fittest works much faster.

The factors determining the margin of profit in the production of any article are the economy, science and skill employed by the producer of the article, and in agriculture we probably have a vocation second to none for the possibilities it affords in the above directions.

Co-operation is synonymous with economy. As a local example the Natal Mealie Growers Union may be cited, whose operations in securing a reliable supply of fertilisers at a bulk rate for distribution to members, and grain sacks at a reduced price, has done much towards fostering the production of one of our principal agricultural staples.

Theoretically, a skilled agriculturist must embrace a knowledge of botany to assist in breeding selected types of plants; geology for a better understanding of the sources and needs of his soil; pathology to enable him to recognise and treat disease in animals and plants; entomology as a weapon for identifying and destroying noxious insects; this and other knowledge will always have calls made upon it. Practically, however, in place of the one man generalising in all these subjects each separate department has its specialists, men trained in their particular spheres and keeping abreast of modern methods by the interchange of discoveries and ideas, and placing their combined knowledge at the disposal of the farmer. This is another phase of co-operation—scientific co-operation—as distinguished from the commercial co-operation previously indicated.

There are, however, certain directions in which the farmer must to some extent be his own scientist and makes his own researches, principal among which is the treatment of his land for the production of crops. The main principles of tillage require modification to meet the needs of differing localities and conditions.

Of all the factors bearing upon the production from two given pieces of land the natural fertility of each may be considered the primary one, but modern science has indicated so many methods of assisting nature in the production of crops, that this question of "good" land is losing its relative importance.

The improvement of naturally poor land, and the maintenance of fertility in a soil that is yielding annual crops, demands treatment which may be included in one or other, or both, of two classes; treatment necessitating a direct outlay from the farmer's pocket, *e.g.*, the purchase of chemical fertilisers, or treatment, generally extending over a period of years, which does not necessitate any direct outlay. In this latter class

the following may be included :—Growth of leguminous crops; inoculating with soil bacteria; breeding improved types of corn; feeding crops on the land; and the introduction of improved tillage methods.

The term tillage, in this connection, is used to denote the mechanical treatment of the soil for the production of crops, embracing such practices as the Campbell system of dry-land farming and the reclamation of undrained areas. The object of tillage being to bring the soil into just that condition of air, moisture and heat which will be favourable to the presence and production of those soil organisms responsible for the breaking down of the plant food present, into a state in which it is available for the production of crops, it will follow as a natural sequence that the exact treatment required for the soil varies with the nature of that soil, and this is where the skill of the individual cultivator comes into play.

The Campbell system in principle consists in conserving the accumulation of water in the soil, obtained from a rainfall too slight to permit of raising profitable crops with the ordinary tillage methods, and it would appear that the ravages of East Coast Fever in Natal may permit of the introduction of a system calculated to possess some of the advantages of the dry-land methods.

The advantages of a dry winter for harvesting and drying a maize crop, when all operations can be conducted in the open without danger of damage by rain, cannot be overlooked, but at the same time disadvantages also attach to such a climate, accentuated considerably in seasons when spring rains are either exceptionally late or unusually scanty. The current season's maize crop has undoubtedly suffered to a considerable extent through late ploughing caused by the lack of rain in October. In the absence of cattle the necessity for retaining the mealie fields unbroken as winter grazing areas disappears, and it may therefore be expected that in many districts autumn ploughing will be generally adopted. Such a system renders the agriculturist independent of spring rains; the land will be sufficiently soft to permit of an early ploughing; the soil will receive a thorough aeration during winter; the destruction of many hibernating insect pupæ will be effected by exposure to frost; suitable conditions for the activities of soil bacteria will be attained, and the surface mulch created by the autumn ploughing will greatly reduce the amount of soil moisture evaporated during the dry season.

The food supply of the young mealie is absorbed by the root hairs in a state of solution, therefore the amount of nourishment obtainable will be in ratio with the amount of moisture in the soil, up to a certain point, provided, of course, that the necessary root constituents are present in the soil in a soluble form.

To permit this autumn ploughing to have all the effect desired it

should be performed as early in the season as possible. As soon as the mealie crops are glazing the crop may safely be cut and placed in stooks; if these are arranged in parallel lines the intervening land may be immediately ploughed before its exposure to the sun has rendered it too hard for cultivation.

That East Coast Fever is not an unmixed evil is an expression voiced only by those who have not yet had the misfortune to suffer from its ravages, but if it indirectly evolve a better system of arable farming it may do much towards redeeming the damage it has wrought to Natal farmers.

Breeding from vicious parents will not produce the sort of horses that are desirable on the farm. Neither will trotting horses make good animals for agricultural purposes.

Veterinary physicians and surgeons advise washing the galled shoulders of the horse with a mixture of alum and water. This is soothing and cooling to the affected parts.

Don't put your horse away at night without examining his feet. A nail may have been picked up or a stone wedged in the cleft of the frog of the foot which if removed at once, will save serious trouble.

Every hen that does not pay for her keep by laying eggs should be sold at once. There are thousands of hens in the poultry yards that are losing money for their owners. Find out whether you have such hens, and, if so get rid of them.

The periods of incubation recognised as approximately correct are as follows:—Common hen, twenty-one days; pheasant, twenty-five days; duck, twenty-eight days; pea-fowl, twenty-eight days; guinea, twenty-five days; goose, thirty days; turkey, twenty-eight days.

The dairy cow should be persuaded to eat all she can. To this end, succulence is probably the cheapest and most satisfactory aid, and if to such a succulent ration the additional good qualities of easy digestibility and richness in protein be added, then the dairyman's problem is solved.

A Visit to a New Manure Works.

By W. R. SIMPSON LADELL, A.I.C., F.C.S., etc., *Chemist, Cedara.*

A SHORT time ago I had the pleasure of visiting Mr. G. J. H. Webster's factory for the manufacture of bone and refuse manures. Bone manure is much used out here, but refuse manures are very little known, and they are not appreciated as they should be.

Mr. Webster's works are situated near Bisley Station, and, although not very big, they are capable of dealing with considerably more material than is at present available.

The raw materials used are chiefly bones and offal from the Government Abattoir and from neighbouring farmers.

A necessary process in the manufacture of bone dust manure is the removal of fat, fat retarding the decomposition of the bones in the soil and having no fertilising value itself. For this purpose the bones are either boiled separately with water or are placed with hoofs, etc., in a digester of 750 gallons capacity, where they are submitted to a steam pressure of 40 to 50 lbs. per square inch. This treatment effectually sterilises all the substances, a very necessary particular where they have been obtained from diseased beasts.

Neatsfoot oil and gelatin are obtained as bye-products from this digester. The oil is run off into tanks where it is allowed to stand for some days under the influence of sunlight, which helps to clarify the oil. The clear oil is then run off from the sediment by means of taps in the upper parts of the tanks, and is ready for the market.

The bones, after passing through the digester, are quite white and as brittle as chalk. They are now put through a mill together with the other bones and are thereby broken up into small pieces. These pieces are put through a disintegrator, a machine working at the rate of 3,500 revolutions per minute, by which they are ground up to a powder. This machine is provided with a kind of cloth balloon which catches the fine dust and prevents waste. The material is finally sifted to separate the various grades of fineness, after which it is ready for use as a fertiliser. This bone-crushing plant can cope with 2 to 2½ tons of stuff per diem.

The hoof residues from the digester are placed with scraps of hide in a big ajcketp-an, through the double sides of which steam is circulated, thereby heating the contents of the pan. The mass is liquified and run off; after cooling and solidifying it is cut into strips which consist of glue.

In the manufacture of meat guano Mr. Webster is one of the pioneers in this Colony, but he possesses up to date machinery for this

purpose. All the fatty materials are placed in a digester of a similar type to that used for the treatment of bones and hoofs; here the mass is submitted to a moderately high pressure, sufficient to sterilise it effectually, but not high enough to extract a great deal of impurities with the tallow, and spoiling the latter by rendering it permanently dark in colour. The melted tallow is run off into tanks, where it is purified by floating on top of water after being liquified by means of steam coils. In this way most of the impurities settle to the bottom of the tanks and the purified tallow can be removed readily and sent off to the consumers. The residue after the extraction of the tallow is put into a drier along with various kinds of offal. The drier is similar in appearance to a horizontal boiler; it is provided with double jacket through which steam circulates and a horizontal shaft fitted with side arms which churn up the substances inside the machine. The heat of the steam drives off the water from the materials, and this is carried away by means of centrifugal fan. In this way all offal is soon reduced to a dry, friable mass which possesses excellent fertilising properties, containing, as it does, a good proportion of phosphoric acid readily available for plant nutrition, as well as useful organic matter and nitrogen.

All the machinery in the works is driven by means of two boilers, one giving 10 h.p. and the other 8 h.p.

I was much impressed by the care with which all the processes are carried out and by the general cleanliness of the works, the latter detail being all the more commendable when one considers the class of material dealt with.

Mr. Webster's factory should become the nucleus of a big and useful industry, and will help to hasten the time when this Colony will be almost entirely self-supporting.

Clean the cans just as soon as the milk is emptied, being careful to clean thoroughly about the seams. A good, stiff brush is the thing to use in this work.

The profitable production of any crop continuously on the same area is impossible. Sooner or later the yield will reach a point where the fixed charges will equal the value of the crop produced.

Avoid in-bred bulls, as in-breeding has a tendency to weaken the constitution, and, surely, if any class of cattle require a good constitution it is dairy cattle, from the nature of the demands made upon them.

Tanning in South Africa and its Drawbacks.

By A. LYLE.

I HAVE no doubt that to the observant man the thought must have often occurred: Why is it that there are few tanneries in South Africa capable of supplying the general requirements of the country, for, outside of the Cape Colony, tanneries, up to a year ago, were conspicuous by their absence; and what is the cause? I will endeavour to give what are, in my opinion, the chief causes for this want, and in expressing my opinions, I may state that I am guided by experience gained during the past twenty-five years, both as a tanner and in the harness-making trade. Tanneries have been established in the Cape Colony for a number of years, yet they are still unable to manufacture leather suitable for all requirements of harness and saddle work, and I am confident that they are suffering from some of the troubles I wish to deal with, as it has been proved that they are still unable to produce leather that would compare with second quality English tanned.

SOME OF THE DRAWBACKS.

In reciting some of the drawbacks that tanners have to contend with, I will commence with the raw materials. This, it must be admitted, is one of the most important essentials of any industry, for unless the raw materials that are to be worked up are suitable, it cannot be expected that a good article can be produced. The tanners have all along found it a difficult matter to secure good hides; by this I mean hides from well-grown bullocks, and why? Because bullocks in South Africa are not reared for any other purpose than transport, consequently they are made to work very young, and kept at work till too old for further use, or die of disease. During the period that the animal is at work it has very often to go long spells without proper food, and, during the severe winter months, is not able to get sufficient food to keep it in condition, consequently it becomes emaciated, and it naturally follows that the hide must suffer, and cannot be properly developed, being, in most cases, heavy in one part and very thin in another. Another factor which causes a deal of annoyance to the tanner is the scars on the hides caused by the heavy whips, used to extremes by the native drivers throughout South Africa. Were the effect of this method of punishing oxen better understood—that it depreciated the value of the hide to say nothing of its cruelty—I feel sure that some better method would be adopted.

INDISCRIMINATE BRANDING.

The next factor to which I wish to refer is the indiscriminate branding of cattle, and in this I feel that all those interested in the question will agree with me, and I am sure that some other method could be adopted that would be more serviceable, and at the same time not so cruel and damaging to the hide. I have often come across hides with brands quite a foot square, and it is needless to state that such hides are generally useless for leather. It often happens that the brand is placed on the rump of the bullock, and as this part of the hide is best, it will be readily understood that hides so branded are not of so high a value as those unbranded. Could not some method of branding on the horn or ear-marking be adopted? With regard to the ear-marking of cattle, I have been shown a very ingenious device, whereby cattle can be so marked with very little trouble and little hurt. I trust this system will be taken up by the Governments of the various Colonies, with a view to its adoption. When the farmers of South Africa realise the necessity of raising cattle for the value of the beef and hide, then we can rest assured the tanner will, in a great measure, be able to produce a better article.

FLAYING AND DRYING.

Another factor which gives tanners just cause for complaint, and which I feel safe in saying involves a loss of hundreds of pounds per annum, is the careless flaying of the hides. Butchers, as well as farmers, should make a special note of this. So far as I can gather Natives are used solely for this work, and they have not the least idea as to the damage they are causing when making large gashes in the hides they are flaying. I am led to understand that this matter was taken up in Australia, with the result that the Government appointed inspectors, and fines were inflicted for each cut found on each hide. I trust my remarks on this subject will be taken seriously by those concerned.

There is another question, which to my mind could be easily rectified, that is the method of drying hides. The usual method adopted by the farmers and country butchers is to lay the hide out in the sun to dry, remaining out all weathers till ready to be packed away. I would point out that should rain come on while the hides are out drying they are not taken in, and the result is that a certain amount of rain-water is collected in the hide, and when the sun appears this water is absorbed, causing damage to the hide. I would suggest that all hides or skins, after being flayed, be laid out in a shed, and a light sprinkling of coarse salt be thrown over the flesh side, and allowed to remain for, say, a day or two, then hung over beams in a shed to dry. By this method, I can assure all concerned, they would reap an advantage.

Now to come to the question of water for tanning purposes. Some have the idea that any water will do. This is a great mistake, as water,

though pure to look at, may be highly charged with organic matter, and is then altogether unsuitable for tanning purposes. Water that has the slightest taint of iron is also most unsuitable, and should water of this description be used it will be impossible to produce leather of a good colour without the use of a chemical.

CARELESSNESS IN TANNING.

The chief reason why tanners have not been successful in South Africa is the fact that they are over anxious to sell their productions, not caring whether they be good, bad, or indifferent. We shall agree that if one expects to make a success of any industry, there are certain ends that must be attained, and when once attained must be maintained. The first is quality. Many people have an idea that an industry has only to be started, and success is assured. But I fear many have found this to be a fallacy, because the public is not prepared to support any industry that cannot supply an article near or equal to the imported, even should the cost be a trifle less.

Many have the idea that the old method of tanning, wherein it was considered necessary that certain hides should take twelve months to undergo the process of tanning, is the best. I must admit that when I have used leather that has been tanned by this process I have found it to be of far better quality than that tanned in a shorter period. I refer particularly to leather for harness-making and sole leather; lighter leathers, naturally, do not require such a lengthy process as I have mentioned. The longer the period that hides are allowed to remain in the tan liquor the better the results, yet some tanners expect to have leather suitable for harness-making after three or four months. Naturally the leather is unsatisfactory, and cannot give satisfaction, either to the man who works it into harness or the man who has to use the made up article. I should point out that the action of the tannic acid is to strengthen the fibres of the hide, and the longer it remains in the tan the greater the strength, at the same time adding to its pliability in the currying process. It is important that the materials to be used be pure and of good quality, and I strongly condemn the forcing process used by the tanners. The greatest care should be exercised in providing proper ventilation in the drying-rooms. Unfortunately this has not been considered in the many tanneries I have seen, any shed that has a roof over it sufficing for the purpose. Can we wonder, then, that tanning has not been the success it should?

I have often been asked whether it would be possible to manufacture all the various materials required in the making of boots and shoes in South Africa. I fear that to this I must give an answer in the negative. Climatic conditions alone render it impossible, besides which some of the finer leathers that are used in the manufacture of boots are peculiar

to the country in which they are made. Yet for the general purposes of this country suitable leather can be turned out, and I have seen very good quality leather supplied from one of the Cape tanneries. The trouble is, that so far as I can learn, the supply is not equal to the demand.

The amount of leather that is now being imported into South Africa amounts to many thousands of pounds, and the Australians are supplying a very large proportion of this amount, but in Australia cattle are reared almost solely for the beef and the hide, and were it possible for the tanners in South Africa to procure hides equal to the Australian, we could hold our own against that country.

I trust that should I have had occasion to give some hard knocks, they will be taken in the spirit in which they are meant. I have but one object in view, that being an endeavour to get all concerned to do their utmost towards improving the condition of the cattle, and to influence the butchers to take greater care in the flaying.

Keep a small box of wood ashes or charcoal where the hogs can get at it. It will do wonders toward keeping them healthy and their digestions strong. A little attention to matters of this kind will result in a more thrifty growth and quicker fattening.

A cement milk tank is the latest use to which cement has been put. It can be built in one corner of the cellar or milk-house. The water will remain cool much longer in it than in the old-fashioned wood tank, and it will be impossible for germs to hide in the pores.

For concrete floors, mix thoroughly with water three parts of sand to one of cement, add five times the bulk of cement in fine stone, and mix again. After spreading, tamp with a base ten inches square until the water appears on the surface. Smooth the surface and let dry for five days.

The best cow, regardless of her type or conformation, is the one that produces the most butter fat from a given amount of food without improving her vital forces.

The dairy farm is universally considered the most prosperous farm. But the dairy farmer can not realise the fullest extent of prosperity unless he makes good use of the by-products.

Botanical Analyses of Veld Herbage.

By J. FISHER, BIOLOGIST, CEDARA.

I.

Report upon the Botanical Analysis of the Veld Herbage, from virgin land on the Railway side at Winkle Spruit, made during March, 1910.

THE manner of procedure was the same as that adopted in the analysis of the veld herbage in the Dairy paddock at Cedara. Nine square feet were taken, each square foot being separate from the others, and each as thoroughly representative of the herbage as possible. The vegetation was entirely removed from each separate square foot, and the different species of grasses, etc., were separated. Owing to the fact that there was no chemical balance available the different species were parcelled up and the weighings have been done here at Cedara.

The herbage will, therefore, be somewhat drier than that from which I made the former analysis, but this will not affect the percentages of the various species. The only difference will be noted in the total weight of herbage calculated from one acre.

The details of the investigation are as follows :—

No. 1.—Area taken, 1 sq. foot. Total weight of herbage, 79·9 grams, made up as follows :—

Andropogon schirensis, 11·51 grams.
Andropogon hirtus, 13·3 grams.
Andropogon ceresiaeformis, 10·75 grams.
Aristida junciformis, 14·72 grams.
Undetermined graminaceous herbage, 24·03 grams.
Leguminous plant sp. ? 5·59.

No. 2.—Area, 1 sq. foot. Total weight of herbage, 66·62 grams, constituted thus :

Aristida junciformis, 26·77 grams.
Panicum laevifolium, 1·0 grams.
Panicum sp., 1·85 grams.
Andropogon nardus, 5·58 grams.
Andropogon ceresiaeformis, 9·01 grams.
Andropogon schirensis, ·80 grams.
Undetermined graminaceous herbage, 18·1 grams.
Leguminous plants sp., ·97 grams.
Helichrysum sp., 1·29 grams.
Lobelia sp., ·85 grams.
Miscellaneous plants, ·40 grams.

No. 3.—Area, 1 sq. foot. Total weight of herbage, 89·94 grams, made up of :—

Andropogon ceresiaeformis, 9·75 grams.
Andropogon schirensis, 39·05 grams.
Andropogon hirtus, 5·81 grams.

Andropogon auctus, 2'20 grams.
Paspalum scrobiculatum, '97 grams.
Panicum laevifolium, 7'69 grams.
Aristida junciformis, 4'78 grams.
 Undetermined gramineous herbage, 16'50 grams.
 Leguminous plants sp., '62.
Helichrysum sp., 2'06 grams.
 Miscellaneous plants, '51 grams.

No. 4.—This sample was taken from the veld at the back of the Experiment Farm Winkle Spruit, and was rather old for proper examination. Total weight of herbage, 36'45 grams :—

Anthisteria imberbis, 11'22 grams.
Aristida junciformis, 14'75 grams.
Scripus sp., 1'26 grams.
 Undetermined gramineous herbage, 9'22 grams.

No. 5.—Area, 1 sq. foot. Total weight of herbage, 52'48, as follows :—

Andropogon ceresiaeformis, 6'37 grams.
Andropogon schirensis, 4'50 grams.
Andropogon auctis, 3'16 grams.
Aristida junciformis, 13'80 grams.
 Undetermined gramineous herbage, 15'38 grams.
Fimbristylis sp., 5'32 grams. Identified by Mr. Medley Wood.
 Leguminous *Indigofera* sp., 2'85 grams.
 „ Undetermined, '38 grams.
 Miscellaneous plants, '72 grams.

No. 6.—Area, 1 sq. foot. Total weight of herbage, 71'48 grams :—

Andropogon ceresiaeformis, 10'57 grams.
Andropogon schirensis, 8'80 grams.
Andropogon hirtus, 18'38 grams.
Aristida junciformis, 12'70 grams.
 Undetermined gramineous herbage, 16'75 grams.
Fimbristylis sp., 1'66 grams. Identified by Mr. Medley Wood.
 Leguminous plants :—
Indigofera sp., 1'31 grams.
 Leg. unknown, 1'31 grams.

No. 7.—1 sq. foot. Total weight of herbage, 109'11 grams :—

Andropogon hirtus, 7'7 grams.
Andropogon ceresiaeformis, 18'32 grams.
Andropogon amplexans, 6'29 grams.
Andropogon nardus, '79 grams.
Andropogon schirensis, 17'23 grams.
Aristida junciformis, 35'95 grams.
 Undetermined gramineous shoots, 21'26 grams.
 Leguminous *caesia* sp., '67 grams.
 Miscellaneous plants, '9 grams.

No. 8.—1 sq. foot. Total weight of herbage, 88'39 grams, as follows :—

Andropogon ceresiaeformis, 8'46 grams.
Andropogon amplexans, 11'32 grams.
Andropogon schirensis, 1'25 grams.
Andropogon hirtus, 13'87 grams.
Aristida junciformis, 25'68 grams.
Eragrostis major, 1'17 grams.
 Undetermined gramineous herbage, 25'51 grams.
 Miscellaneous plants, 1'13 grams.

No. 9.—Area, 1 sq. foot. Total weight of herbage, 79·12 grams :—

Andropogon schirensis, 7·55 grams.
 Andropogon cerasiaeformis, 14·07 grams.
 Andropogon amplexens, 6·43 grams.
 Aristida junciformis, 13·22 grams.
 Undetermined gramineous herbage, 26·02 grams.
 Carex sp., 4·06 grams.
 Leguminous sp., 7·77 grams.

The total weight of the herbage per acre would be —

3 tons 4 cwt. 0 qrs. 3 lbs.

The Gramineae constitute 93·82 per cent. of the total herbage.

The Leguminous plants constitute 3·18 " " "

Miscellaneous plants constitute 3 " " "

Total ... 100 " " "

Of the total gramineous plants, the following are the percentages of the various species :

Aristida junciformis,	25·69 per cent.	Andropogon nardus	1·00 per cent.
Andropogon schirensis	14·35 "	Andropogon auctus	·84 "
Andropogon cerasiaeformis	13·81 "	Panicum sp.	·28 "
Andropogon hirtus	9·34 "	Eragrostis major	·18 "
Andropogon amplexens	3·80 "	Paspalum scrobiculatum	·15 "
Anthistiria imberbis	1·77 "	Undetermined grami-	
Panicum laevifolium	1·37 "	neous herbage	27·34 "

The Leguminous plants constitute only a small percentage of the natural veld, and only two determinate genera were represented. These were :—*Indigofera* and *Caesia*. The other plants were not able to be identified.

The family *Compositae* were represented by the genus *Helichrysum*, and the family *Campanulaceae* by the genus *Lobelia*; the *Cyperaceae* are represented by *Scripus*, *Carex*, and *Fimbristylis*.

II.

Report upon the Botanical Analysis of the Veld Herbage from the Farm "Riversdale," Howick, on the occupation of Mr. Geo. Ross

The method of procedure was the same as that at Cedara and Winkle Spruit.

The investigation was commenced on the 16th of February, 1810. On this date three separate samples each from 1 sq. foot of land were taken, and the contents separated. Owing to my being called away down to Winkle Spruit no further samples were taken till April 1st, 1910, on which date six more samples were taken, thus making the same number of samples as taken from the veld at Cedara and Winkle Spruit.

The details of the investigation were as follows :—

No. 1.—Area, 1 sq. foot. Total weight of herbage, 153·78 grams :—

Trachypogon polymorphous	21·17 grams	Gramineae.
Tristachya leucothrie	1·55 "	
Anthistiria imberbis	13·12 "	
Eragrostis chalcantha	8·3 "	
Harpechloa capensis	0·4 "	
Undetermined gramineous herbage	86·75 "	Leguminosae.
Lathyrus sp.	12·32 "	
Undetermined leguminous herbage	6·05 "	
Miscellaneous plants,	4·12 grams.	

No. 2.—Area, 1 sq. foot. Total weight of herbage, 149·69 grams :—

Andropogon amplexans	37·22 grams	} Gramineæ
Tristachya leucothrie	77·11 "	
Anthistiria imberbis	12·07 "	
Eragrostis brizoides	10·5 "	
Undetermined gramineous herbage	8·1 "	
Undetermined leguminous herbage	1·5 "	} Leguminosæ.
Miscellaneous plants, 3·19 grams.		

No. 3.—Area, 1 sq. foot. Total weight of herbage, 166·38 grams :—

Andropogon amplexans	68·28 grams	} Gramineæ.
Tristachya leucothrie	57·82 "	
Undetermined gramineous herbage	34·51 "	
Miscellaneous species, 5·77 grams.		

No. 4.—Area, 1 sq. foot. Total weight of herbage, 102·2 grams :—

Anthistiria imberbis	70·70 grams	} Gramineæ.
Andropogon hirtus	11·35 "	
Andropogon amplexans	3·70 "	
Digitaria diagonalis	11·56 "	
Mycrochloa caffra	1·66 "	
Undetermined gramineous herbage	3·23 "	

No. 5.—Area, 1 sq. foot. Total weight of herbage, 129·76 grams :—

Anthistiria imberbis	93·7 grams	} Gramineæ
Andropogon nardus	10·4 "	
Andropogon hirtus	6·8 "	
Digitaria diagonalis	5·19 "	
Tristachya leucothrie	·73 "	
Undetermined gramineous herbage	12·94 "	

No. 6.—Area, 1 sq. foot. Total weight of herbage, 60·90 grams :—

Anthistiria imberbis	47·5 grams	} Gramineæ.
Andropogon hirtus	3·27 "	
Andropogon nardus	2·73 "	
Andropogon amplexans	2·21 "	
Undetermined gramineous herbage	3·62 "	
Undetermined leguminous plants	1·57 "	Leguminosæ.

No. 7.—Area, 1 sq. foot. Total weight of herbage, 100·28 grams,

Anthistiria imberbis	90·55 grams	} Gramineæ.
Eragrostis brizoides	5·9 "	
Undetermined gramineous herbage	3·83 "	

No. 8.—Area, 1 sq. foot. Total weight of herbage, 86·12 grams :—

Anthistiria imberbis	78·20 grams	} Gramineæ
Undetermined gramineous herbage	2·15 "	
Undetermined leguminous plants	5·77 "	

No. 9.—Area, 1 sq. foot. Total weight of herbage, 133·30 grams :—

Andropogon hirtus	55·15 grams.	} probably imberbis } Gramineæ
Anthistiria imberbis	48·22 "	
Setaria sp.	19·57 "	
Mycrochloa caffra	1·12 "	
Undetermined gramineous herbage	9·24 "	

The total weight of the herbage per acre would be—5 tons 2 cwt. 3 qrs. 17 lbs. This is less than 1 cwt. per acre more than from the veld at Cedara, but nearly 2 tons per acre more than that at Winkle Spruit.

The *Gramineæ* constitute 96·27 per cent. of the total herbage. The Leguminous plants constitute 2·51 per cent. of the total herbage; whilst the Miscellaneous plants constitute 1·22 per cent. of the natural herbage.

Of the Gramineous plants the following are the percentages of the various species :—

<i>Anthistiria imberbis</i>	43·57 per cent.	<i>Eragrostis brizoides</i>	1·57 per cent.
<i>Tristachya leucothrie</i>	13·16 „	<i>Andropogon nardus</i>	1·26 „
<i>Andropogon amplexens</i>	10·69 „	<i>Eragrostis chalcantha</i>	·79 „
<i>Andropogon hirtus</i>	7·34 „	<i>Microchloa caffra</i>	·26 „
<i>Trachypogon polymorphous</i>	2·03 „	<i>Harpechloa capensis</i>	·03 „
<i>Setaria</i> sp.	1·87 „	Undetermined gramineæ	15·77 „
<i>Digitaria diagonalis</i>	1·60 „		

The Leguminous plants are fewer than was the case down at Winkle Spruit, and the genera were, in all cases except one, indeterminate. The Miscellaneous plants are also fewer than in the veld at Winkle Spruit.

The last six samples were taken from what is termed blue grass veld, owing to the glaucous tint which the herbage presents. Most of this, however, was not made up of the true blue grass (*Hydropogon hirtus*), but, as a glance at the percentages will show, of another grass (*Anthistiria imberbis*), the leaves of which often present the same bluish tint as the well known blue grass. The grass *Athistiria imberbis*, is the one which was the most represented in the veld here at Cedara.

Pigs suffering from scours may be helped and many times cured by feeding them a little boiled milk in which has been placed a pint of scorched flour to each gallon of the boiled milk.

If you are after a profitable sow, better not pay so much attention to the number in the herd book as to good bone, good constitution, and big litters.

No orchard will thrive on undrained soil. Drains should be run between rows of trees of fifty feet apart. Put them down deep enough to prevent damage from frost.

It is a mistake to feed all sizes of pigs together, especially when the smaller ones are to a disadvantage.

Top Working Fruit Trees.

By O. B. WHIPPLE,

Field Horticulturist, Grand Junction, Colorado.

(Continued from Page 376.)

CHOOSING THE STUBS.

THERE is much to be gained by the proper selection of stubs into which scions are to be set. A too common practice is to remove the whole top the first year and graft all the stubs. It is surprising that some good results come from such a practice. More often, however, this proves too much for the tree and it fails even after the grafts have made a good start. They may linger two or three years and then die from no other cause than the severe cutting back, though the growers are prone to attribute it to some other affliction. The cutting away of the greater part of the top seems to give good results and may even be advisable in top-working stone fruits. The pear will stand much more abuse in this respect than the apple. A far better plan, in all cases, is to cut away only enough limbs to set scions for a good top. This will generally be about half of the tree, as six stubs will, in most cases, provide for a good top. The working of more stubs results in too dense a top or necessitates their removal later. The remaining limbs may be shortened, but some foliage is needed to protect the stubs and trunk from sun-scald as well as to supply nourishment. If the stubs are well chosen the remaining limbs will do much to protect the young grafts from wind and especially from being brushed out by passing teams and orchard machinery. It is well to choose inside limbs for grafting as they are best protected, but care must be taken not to contract the head of the tree too much. It should be borne in mind that top-worked trees tend to grow upright, but it is a difficulty which may be largely overcome by judicious pruning.

After the scions have made one year's growth much of the remaining top may be removed, but it should seldom all be removed from old trees before the second year. If some stubs have met with accidents or have failed to start the scions, or if the shape of the tree or a scarcity of scaffold limbs has prevented a full top being placed the first spring, it may be completed the second.

While we sometimes see grafts doing nicely in stubs six inches in diameter, it is very doubtful whether such grafts will make a strong union or a long-lived tree. The wisdom of working limbs over three inches in diameter is to be doubted. In the choosing of stubs the grafter

should remember that large wounds properly made heal more readily than large stubs. Choose the smaller limbs for grafting even though the later removal of the top may necessitate the cutting of larger limbs lower down. It is better to raise the head of the tree than to work large stubs. The ideal time for grafting is just as the buds are beginning to swell. While scions may be set earlier, there is danger of their drying out before a union is established. Should one care to prolong the season, it is better to run late than to begin early. Some go through the orchard in winter and remove the tops of the stubs that are to be grafted, cutting them at least a foot above where the scions are to be placed. This saves some time, and by hauling the brush out before the grafts are set it saves some of them from being knocked out by careless men in removing it later. When ready to graft, the stub is recut from a foot to eight inches lower.

PROTECTING THE BODY.

Since the removal of any considerable part of the top often exposes the body of the tree to the direct rays of the sun, it is well to whitewash the trunk and main branches. The whitewash reflects the rays of the sun, and by such an application many cases of sun-scald may be avoided. A good whitewash may be prepared by using one pound of good quicklime to each gallon of water. The addition of a pound of salt to each three gallons of the wash tends to make it stick better. This can best be applied with a spray pump. A good coating can only be secured with two applications; the second to follow as soon as the first is dry.

SCION-WOOD.

In this connection it is well to say a word about the selection of scion-wood for grafting. The man who is interested in his bearing orchard has early learned that the individual trees in the plantation show a great variation, especially in productiveness, and very often in the size, colour and quality of the fruit. Some of this variation may be accounted for in various ways, but, after all, we are coming to believe that, environmental conditions being equal, no two trees are alike in bearing habits. It is a natural variation. There are trees that never bear well and scions from such trees will, no doubt, produce trees very much like them. In the selection of grafting wood it is well to bear this in mind. Mark your favourite trees and select scion-wood from them.

The wood used should be one year old, strong and well matured but not overgrown. The terminal shoots from trees that have made a growth of from twelve to eighteen inches make excellent scions. The question is often asked as to the use of watersprouts. The term watersprouts may mean different things to different people. By watersprouts we generally mean rank growth from adventitious buds; and such growth with immature tips, weak buds far apart, and pithy centres make very poor scion

wood. Otherwise, any new wood with well-developed buds, comparatively close together, may be used for scions. The statement sometimes made that watersprouts never produce fruit is erroneous.

Scion-wood should be gathered in the autumn, preferably as soon as the leaves have fallen, and stored until spring. The object is not to avoid winter injury, as some think, but to keep the scions in a dormant condition. Few realise that buds complete the resting period early in the winter, and may, under favourable conditions, begin to swell before the winter is over. The object of keeping the scions dormant is to allow time for a partial union before the buds are started into growth by the warm days of the grafting season. Scions with buds well swollen often throw leaf surface before a sufficiently strong union has been made to support them. The result is the exhaustion of the stored-up food supply and moisture of the scion to a point which may cause its death.

The scions may be stored in sand in a cool corner of the cellar or buried out of doors. The main object is to keep them cool and moist and away from fluctuating temperatures. An excellent plan is to bury them on the north side of a building or in some spot shaded most of the day. they need not be buried deep, from twelve to eighteen inches being sufficient in a well-shaded spot.

GROWING THE TOP.

It would hardly seem wise to leave the subject of top-working old trees without some comment on future treatment of the grafts. The setting of the scions is only the first step in working over the tree. Should we stop here, a most miserable failure, or, at least, a poor top would be the result. Many a good catch is ruined by neglecting the pruning the first two seasons. During the first season the grafts should make a very rank growth, and they will require some pinching back to save them from becoming top-heavy and consequently easily blown out. The common practice is to head-in the rapidly growing shoots when they have attained a length of from eighteen inches to two feet. This forces branches from below, and if growth becomes too heavy these may need cutting back before the season is over. This pruning insures stockiness of the new growth and throws much of the energies of the top into a good union. The growth of suckers or watersprouts from the stock should not be allowed to any great extent. Should the stubs be exposed to the direct rays of the sun it is well to leave some of this growth, pinching it back to cause it to form a dense shade. Unless needed for protection it is well to rub the sprouts off as fast as they appear.

The following spring the system of pruning should resemble very much that of pruning young trees. The growth of the grafts should be cut back to usually not over eighteen inches in length. They may be cut even shorter if the growth has not been satisfactory. If all three buds

have started from a scion, it is well to remove all but one to avoid crowding. As a rule the growth from the lower bud will be the strongest and should be retained. Should the formation of the top allow it, a second growth may be left. If the grafts have been set in near the head of the trees they will require some pruning in reference to spreading the top. The general tendency is for the top-worked tree to grow too compact. Cut the grafts back to one of the strong outside branches started by the first pinching back, and it will give them a start in the right direction. What shall we do where the scions start in the same stub? Should the stub be less than three inches in diameter one should be removed at this time. Keep the stronger, or if there should be little difference, the one best situated to help make a good top. Cut the other off close, even to removing a small corner of the stump on that side, the wound will heal better. Should the stub be over three inches in diameter the crisis is some argument in favour of leaving the extra graft another year. It will help callous over the stub, and may be removed the following spring, leaving a comparatively small wound. If left longer, or until the two grow together, the result is a bad crotch and sometimes a pressure which may actually split the stub.

Subsequent pruning will consist in such cutting back as will help form a stocky and well-shaped top. They will demand the same attention as young trees. Spread the top by pruning to outside buds or branches and do not pay too much attention to the small wood. Some of the small branches may require cutting out or clipping back, but, remember, in it we have the start for early fruiting wood.

TOP-WORKING YOUNG TREES.

There is a growing conviction among the fruit-growers that better results may come from planting vigorous young trees of some strong, growing kind to be later worked over to the desired variety. In the opening remarks on this subject, mention was made of the desirability of working weak-growing kinds on stronger root-systems, as well as top-working as a means of lessening loss from attacks of root rots and woolly aphids. The embarrassment of growing the orchard to a bearing age only to find some of the trees not true to name may be avoided by this plan of starting the young orchard. Then every fruit-grower has observed that few trees of the same variety are alike in bearing habit and character of fruit. No doubt, many growers have some particular tree in their bearing orchard which is better than all others, that is nearer their ideal. By choosing grafting wood from this tree, a young orchard may be grown as near like it as is possible. There are productive and unproductive trees in every orchard, and the careful selection of scions from productive trees will avail much as a means of building up a fruitful orchard.

In top-working young trees it is a common practice to set the trees

where they are to grow, and, after the scaffold limbs are well formed, to graft or bud into these the future top. Some Eastern men have advocated purchasing two-year-old trees in the fall (trees in which the head is already formed) to be grafted over indoors in December.* In the West, and especially on a large scale, this system would hardly seem practical. The method of grafting in this case is whip-grafting.

GRAFTING.

In grafting young trees in the field it is probably well to do it as early in the life of a tree as possible. As soon as a good strong framework can be secured the tree is ready for top-working. The small size of the stubs make cleft-grafting difficult and kerf-grafting almost out of the question. Some growers, however, report good success in cleft-grafting young trees after two years' growth from a yearling whip. In this case the stubs must be bound with waxed cloth or other material to hold the scion firmly, and then waxed as in cleft-grafting larger stubs.

Another style of grafting, known as whip-grafting, is well adapted to working these small stubs of young trees. With this style of grafting it may be possible to set the scions after one year's growth in the field, but it is doubtful whether much time will be gained by such practice. The scion should be as near the size of the stub as possible, if anything, a little smaller. The cambium of the stock and scion is matched only on one side, paying no attention to the other. The joint should be well wrapped with waxed cloth, and, to be doubly sure all air is excluded, may be painted over with a warm wax.

In grafting young trees it is a common practice to remove all of the top, placing scions in those arms one wishes to keep. It is always well to work a few extra stubs as accidents may befall some of the scions. The season for top-grafting the young trees is the same as for old trees. While top-working the old trees tends to hasten the bearing of the scions, it is doubtful whether top-working young trees induces earlier fruitfulness.

BUDDING.

This is no doubt the simpler method of putting a new top on young trees. While the process of budding is a little more delicate than that of grafting, the average man can, with a little practice, get very satisfactory results. Buds should be placed as soon as the top is well formed, setting one or two in each scaffold limb that is to be retained. The buds are generally set from six to twelve inches from the main stem, depending on the formation of the head. Trees two years old when set may generally be budded the following fall, and should yearling whips make a strong growth, the arms may be large enough to receive buds in

* Corresponds to June in Natal.—ED.

September.† Any stem as large as a lead-pencil may be budded quite easily. Arms in which buds fail to start may be grafted the following spring. Should arms fail to appear in the proper place it is quite possible to supply them by setting buds directly into the body of the young tree. (When the buds begin to push into new growth they will require about the same care as young grafts. They will need some pinching back to strengthen the stem and to overcome the tendency to become top-heavy. With the possible exception of young trees budded in late spring, all growth from the original stock should be removed as fast as it appears.

Buds may be set during the month of June [December] or early July [January], or in August [February] and September [March].* For June [December] budding the bud-sticks are cut as soon as well matured wood may be found. Good firm wood with well developed buds may generally be cut from bearing trees in the latter part of June [December]. As soon as buds set in June or July [December or January] unite with the stock, the bandage is cut and the part of the stock above the bud is removed. In spring-budding it is well to leave some of the new growth which springs from the arms below the bud. (This takes the surplus sap and help nourish the roots until the buds are well started. Wood from buds set in the spring may not mature well in our climate and is susceptible to winter injury during severe winters. With careful watering it is possible to mature the wood properly, but where practical, fall budding should be given the preference. In the case of peach trees, June [December] budding is preferred where attacks of twig borers often destroy in early spring buds set the previous fall. In the apple and pear it is probably more convenient to bud in the fall. Then, too, arms which are large enough to bud in early spring were large enough the previous September [March], so one really gains rather than loses time by budding in the fall.

In fall budding the buds are taken from the current's year's growth. Buds may be inserted in wood of one, two or three years' growth. The stiffness of the bark of the other wood makes budding difficult. The heavy bark not only makes the insertion of the bud difficult, but in drying out it curls away from the bud exposing it to the air. The simplest form of budding is that known as Shield-budding or T-budding. The position for the bud is chosen with reference to the prevailing wind, protection from the sun's rays, or to best form the top of the tree. The most important factor should determine where the bud should be placed. It is well to place the bud on the shady side of the stock, if possible. Should the locality be subject to strong prevailing winds, the bud should stand more wind if placed on the side of the stock toward the wind. A

† i. e., About March in Natal.—Ed.

* Corresponding Natal months are shown in brackets.—Ed.

fl-shaped incision is made in the bark and the corners of the bark below the transverse cut raised to facilitate starting the bud. The bud is then cut from the bud-stick by starting the knife half an inch below the bud, cutting under and to about the same distance above the bud. This gives a long bud which is especially desirable in a dry climate. In cutting under the bud, the knife should be run deep enough to leave a small shield of wood. Fig. 7 will show the various steps in the process of shield-budding. A simpler method of lifting the bud, at least for the beginner, is to start the knife as before, and cut sharply into the wood to about one-third the diameter of the stick and then upward under the bud, making a tongue about an inch long. The knife is then run across the tongue half an inch above the bud, cutting through and lifting the bark at this point. The bud is then grasped between the thumb and first finger and lifted, leaving the wood on the stick, as shown in the same figure. While the removal of the wood from under the bud is no particular advantage, the method is simpler and gives the inexperienced budder a larger per cent. of good buds. The writer has lifted thousands of buds in this manner with the best of success. It is difficult to cut buds in this way from some varieties of cherry and plum trees with thin bark, but it works well on the apple, pear, peach, apricot and the heavy-barked plum. The bud is then slipped into place as shown in the figure and well wrapped with raffia or soft wrapping twine. About four wraps below and three above, so spaced as to close the whole opening, is sufficient. In wrapping, the common practice is to start below, and by crossing over the first end and running the last end under, the bud is wrapped without a knot. The tying material is usually cut in the desired lengths beforehand, and if raffia is used, it should be kept moist, as it ties better.

If on healthy young wood, the buds will unite within ten days or two weeks. Then the wrapping should be cut by drawing a knife across it on the side of the stock opposite the bud. Should the stock be making a slow growth, there need be no hurry about cutting the tie. The only thing to be guarded against is that the wrap does not cut into the bark. This pressure interferes with the flow of sap, and tends to throw the bud into premature growth; this often means a loss of the September [March] bud. The bud set in August and September [February and March] should remain dormant over winter. The following spring, just as soon as the buds on the top of the stock begin to push out, the original top of the stock is cut away. Should the stock be cut off too early in the spring, or too close, there is danger of the stub drying out to the injury of the bud. Some recommend the practice of leaving a longer stub to which young growing shoot from the bud may be tied until it is well established. This saves some buds from being blown out, but necessitates a second cutting in mid-summer to allow the stub to heal over.

We have said that buds for fall budding should be taken from the

current year's growth. The common practice is to cut the terminal growth from bearing trees. The leaves are trimmed off at once, leaving a small part of the leaf-stalk to handle the bud by. Bud-sticks trimmed in this way may be stored in a cool, damp place and kept for some time without injury. The leaf-stalks, however, will loosen and drop off in many cases if stored over ten days. Of course, this does no harm, but some budders miss the little handle in inserting the bud. The first few buds at the base of the stick are generally poorly developed and should be discarded while those near the tip are too immature to be used. As a rule not over half of the new growth cut in early September [March] will carry buds suitable for budding. The sticks should be carried in a damp cloth to avoid drying out.

AN IMPERISHABLE GARDEN LABEL.—Garden lovers will welcome a new, handy, and ingenious remedy for avoiding the trouble concerning name-tags and tallies of rose and fruit trees. The ordinary means to this end are far from satisfactory, the greatest disadvantage being that the names become easily and quickly obliterated by the weather. With the new label, however, no such drawbacks are possible, inasmuch as the name is indelibly printed beneath the glaze of a small tag of porcelain. The tally is light and substantial, capable of withstanding frosts, the glaze will not crack, and the imprint cannot possibly fade or become defaced as it is burnt in. The tag is attached to the tree by a small piece of specially annealed aluminium wire, which is rust-proof, and will not cut the bark. One great advantage of the novelty is that the tally is always clean, since it is washed by the rain, and will look as good as new after several years' service. The names of over one thousand rose trees are available on this type of label, and a wide variety of fruit names are also prepared. It can, moreover, be obtained in other forms for slipping into the open ground in pots. Another notable feature which should appreciably influence their widespread use is their inexpensiveness, especially when it is remembered that absolute durability is secured. This new label completely solves one of the greatest sources of annoyance to the gardener, be he professional or amateur.—*World's Work*, February.

Cement and Concrete Fence Posts.

By H. M. BAINER and H. B. BONEBRIGHT.*

Continued from page 385.

REINFORCEMENT.

Cement and concrete work has the property of resisting great crushing stresses, but when subjected to tensile stress, the best of it breaks very easily.

For this reason it becomes necessary to put some material possessing great tensile strength into the post, in order that the full crushing strength of the cement or concrete may be utilised. Iron is the most satisfactory material from which to make the reinforcement.

The reinforcement should be placed in the post as near the corner as possible. This places it as far as possible from the neutral axis, thus giving it the greatest advantage in strengthening the post. In order that the reinforcements may be properly held and protected by the cement, it is a good plan to place it from $\frac{3}{8}$ to $\frac{1}{2}$ inch in from each side. This insures a good, firm grip of the cement upon the reinforcement.

The material used for reinforcement should be strong, light, and rough enough to permit the mixture to get a firm grip upon it. It should be very rigid, with little or no tendency to spring or stretch.

A great many special reinforcements are now being made, but the farmer should see to it that the reinforcement which he is to use is reliable, rigid, and easily secured.

The experiment showed that ordinary iron or steel wire was cheapest, strongest and easiest to procure. In order to provide a means by which the cement may cling firmly to the wire, it is best to twist two small wires together instead of using one large one.

If the twisted wire can be bought, cut to the right length and packed in bundles in the same way as bailing wire, it is best to procure it in this way. In case the twisted wire comes in rolls, it becomes necessary to straighten each piece before it can be used. In this case, it is best to purchase common smooth wire of the desired size and twist it on the farm. The twisting is easily done by tying one end of each wire to the opposite spoke of the fly wheel of some machine; a corn sheller or hand cider mill will serve the purpose very well. By tying the other end of the wires to a weight which may drag upon the ground, from 100 to 200 feet of wire may be twisted in a very few minutes.

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In case a small engine is available the twisting becomes still easier. The advantage of the home twisted wire over twisted wire which is bought in rolls, lies in the fact that the former is stright at the end of the twisting process, while the later is bent and must be straightened.

The cutting of the wire is best accomplished as follows:—Set a cold chisel (with the edge up) in a low, rough bench, and at a distance exactly equal to the length of the reinforcement wire from the edge of the chisel, nail a block to the bench. Take a light hammer in the right hand and seize the twisted wire with the left. Then drag the wire over the chisel until the end of it strikes the block, when a light blow directly over the chisel easily cuts the wire. The piece which is cut off is now laid to one side and the end of the main wire is drawn to the block and another piece cut off.

SPECIAL REINFORCEMENT.

Some have suggested that a piece of wood be placed in the centre of the post as a reinforcement. This must be considered a failure, as the wood shrinks and expands by differences in moisture conditions. When it absorbs water, it is likely to swell and burst the post, and again when it dries it will skrink away from the cement.

Gas pipe has also been suggested as one of the best materials to use as a reinforcement. In case plenty of strong second-hand pipe is at hand, this may be true. As the pipe is placed in the centre of the post, it is not in position to act to the best advantage as a reinforcement, and for this reason it should be strong enough to withstand almost all the strain. New pipe would make the posts altogether too expensive.

Crimped wire is also claimed by some to be superior to that which has been twisted, but as the pull comes upon the wire there is a tendency to straighten the crimps. When the wires happen to be near the surface, there is great danger of the post being split by this straightening process.

Band iron and strap iron are also being used as reinforcement. In case the mixture has a good chance to get a grip on the iron, it will probably prove satisfactory, but unless the iron is roughened there is a danger of it slipping.

For very large posts, the twisted steel rods will prove as satisfactory as twisted wire. Smooth rods or smooth wire slip.

CURING THE POSTS.

In order for the cement to become thoroughly cured or "set," water must be supplied to aid in the action. This action goes on for a long time, some authorities estimating the total period at from 15 to 20 years. For the first thirty days the cement should be kept wet if the best results are to be expected. This means that the posts must be kept wet, and the question arises, what is the best system of keeping them in this condition?

The answer is a simple one. The most favourable conditions for conserving the moisture consists in curing the posts in a shed where the wind does not strike them. Under these conditions neither the sun's rays nor the wind have a chance to dry out the posts too rapidly. The only thing that now remains is to keep the posts in a wet condition.

After the posts are placed in an upright position in the curing shed, as described in "Handling the Posts," sprinkle them thoroughly every day. This may be done either by a hose and nozzle in connection with some form of pressure supply tank or by means of a garden sprinkler. In the latter case provision must be made so that the person doing the work may walk upon some structure above the tops of the posts.

The posts should be thoroughly sprinkled every day for at least thirty days.

HANDLING OF POSTS.

In removing the posts from the molds great care must be taken not to allow the posts to sag or crack. A post may be cracked in handling and still be fit for service, but it cannot be considered to be as valuable as an uncracked one.

There are two general methods of removing the posts from the molds.

The first method consists of laying the molds with the posts in them on a level bed of soft sand. The mold is then turned upside down and the post allowed to settle into the sand. The mold is next removed and the post allowed to lay undisturbed for several days. When the post is sufficiently strong it is placed in an upright position to be cured. While this method requires more space it is perhaps a little better for the posts than the second method.

The second method consists in removing the posts from the molds while in an upright position. The post is then allowed to lean against a wall or some other support. Thus only one handling is necessary. Care should be taken to have the bottom of the post close to the wall, as it is very likely to break if not kept very nearly in an upright position.

After the posts are cured and ready to set they should be moved from the curing shed and hauled to the fence line in a wagon having a strong, rigid bed. The bottom of the bed should be covered with a layer of straw to prevent breakage. Not more than three to four layers of posts should be placed in the wagon, depending upon road conditions. It must be remembered that a five-inch post weighs 100 pounds or more. When this is considered, we see how easy it is to load a wagon and also how sufficient weight may be placed on the posts in the lower layer to cause them to break.

In handling and setting care must be taken not to drop the posts. The weight of the post places unnecessary stress upon the different parts, and in case it is dropped there is great danger of it being cracked or destroyed.

A careless workman can easily do more damage to the posts than his services are worth.

WIRE FASTENERS.

In case of the wood post the method of fastening the wire consists of simply stapling the wire to it. In order to fasten a wire to a cement or concrete post a different system must be used.

With the ordinary wood staple in mind, one inventor has designed a small cast iron socket or staple holder which is placed where it is desired in the face of the post before the cement has hardened. When the post is set in the ground, the wire is fastened to it by simply driving an ordinary staple into the socket. The staples pull out much easier than they do from the wood post. The jar of driving in the staples tends to split and crush the post at the point where the cast staple holder is placed. Moreover, the cost of the staples and holders adds greatly to the expense of the post.

Another system consists of two staples which have the prongs bent to the side. The staples are placed about one-quarter inch apart, with the prongs projecting to the side. The line wire is placed between the two staples and a nail or piece of wire is driven down through the staples, outside of the line wire. As the tips of the staple touch the reinforcement wires, direct electric connections are established between the line wire and the ground at the bottom of the post. This, it is claimed by the patentee, insures the user against loss of stock by lightning. The system is called the "Double Staple."

A "single staple" may also be used, but the wire is fastened to the staple by a small "cold shut link," or wire ring. The latter system is not a very strong method of fastening, owing to the ease with which the cold shut links open.

Perhaps the most common method of fastening wires to cement or concrete posts consists of tying in the line wire to the post by means of a piece of smaller wire called a "tie wire" (usually No. 14 or No. 15 wire). The single tie consists of wrapping one end of the tie wire three or four times around the line wire, then passing the long end through a hole in the post and bringing it around to the face of the post where it is also wrapped around the line wire.

The tie around post is much the same as the single tie, except that the tie wire passes around the post instead of through the hole. Neither the single tie or the tie around post are very strong unless the tips of the tie wire are hooked over the body of the tie wire after the wraps have been made. This is known as the "special tie."

The strongest and perhaps the most satisfactory system of tying in the wire is the "Double tie." The tie wire is bent into the form of a long staple, straddled over the line wire and both ends passed through a hole in the post. One end is brought to either side and wrapped about

the line wire at the face of the post. This system insures a solid fastening and is equal in strength to any ordinary wood post fastening.

TAPER OF POSTS.

The holes in the posts are formed by No. 6 wires being placed in the post while it is soft. These wires are called "Tie Hole Pins." They are removed from the poured post after the cement has set for 24 hours. The pins are removed from the tamped posts immediately before the molds are removed.

To obtain the maximum strength with the least amount of material, the cement post must be so shaped as to have its greatest strength at the ground line.

While it is easy to make a post which tapers from the bottom to the top it requires somewhat more material than is necessary and it is smaller at the ground line than at the base. Thus the gradual taper not only uses more material than is necessary, but it reduces the strength at the place where it is most needed.

By making the post of uniform size from the base to the ground line, no material is wasted. The post may then be tapered from the ground line to the top.

Many of the posts which are being made now taper only one-half inch on each side from the base to the top. It has been found that in a 5-inch post which projects 4 feet above the ground, a taper of one inch on each side from the ground line to the top insures almost equal strength throughout. This design gives more strength with less material than those with the continuous taper.

STOCK INSPECTORS.—The following have been appointed Stock Inspectors for the Colony with effect in each case from the date specified:—W. H. Harber (from 15th November, 1909); Edward Boast (acting, for New Hanover Division, from 26th March, 1910); J. Radford (from 1st April, 1910); M. J. W. Ebersohn (assistant, for Nkandhla Division, from 4th April, 1910); C. J. King (assistant, for Ward 4 of the Lion's River Division, from 12th April, 1910); A. J. Swales (acting, for Inanda, Lower Tugela, and Mapumulo Divisions, from 13th April); G. H. H. Coventry (assistant, for Bergville Division, from 1st May); G. R. Murdock, L. Havemann, and Tol Nel (from date of assuming duty).

The Bloemfontein Maize Conference.

REPORT OF THE PROCEEDINGS.

FULL TEXT OF RESOLUTIONS PASSED.

A REPORT of the proceedings of the Maize Conference held at Bloemfontein in January has just been issued by the O.R.C. Department of Agriculture; and as the telegraphic reports which appeared in the daily press at the time of the Conference were necessarily meagre, we publish below the text of the resolutions actually passed by the Conference as well as such portions of the discussions upon these resolutions as are likely to prove of interest to the general reader. The discussion that took place on the first of these resolutions on the production and harvesting of mealies for export, best varieties to grow, grading on the farm, etc., was particularly interesting, and in this case we reproduce it in full as we think there are many matters touched upon in it which will prove of interest to mealie-growers all over the country.

The Conference was held on the 18th and 19th January; and the various Colonies were represented by the following delegates:—

Railway Representatives.—Sir Thomas Price, General Manager, C.S.A.R.; Messrs. A. J. Robb, Assistant General Manager, C.G.R.; W. Binns, C.G.R.; J. McConnachie, District Traffic Superintendent, N.G.R.; John Raimie, Durban Harbour Captain; W. J. K. Skillicorn, N.G.R., General Manager's Office; S. Seruya, C.F.L.M.; D. Watson, C.S.A.R., and G. S. O'Neil, C.S.A.R.

Chambers of Commerce.—Messrs. A. Keeling, Johannesburg; A. Lewis, East London; M. W. Hayne, Durban; K. Spilhaus, Capetown; Geo. Hobson, Basutoland; W. Ehrlich, Bloemfontein; C. F. Kayser, Port Elizabeth; H. Ruffel, O.R.C. Chamber of Commerce.

Shipping Interests.—L. MacLean, Union-Castle Line; Otto Siedle, Natal Direct Line, Durban; A. H. Rennie, Natal; W. Macfarlane, Union-Castle Line, Durban.

Departments of Agriculture.—W. J. Palmer, Director of Agriculture, Bloemfontein; M. J. Joubert, Bloemfontein; B. Enslin, Pretoria; B. Stilling-Anderson, Co-operative Expert, Transvaal; J. Burt-Davy, Government Botanist, Transvaal; R. W. Thornton, Capetown.

Producers.—Messrs. H. A. Light, Natal; J. Moon, Natal; H. Stanley, Wepener; Wm. A. McLaren, Vereeniging; J. B. de la Harpe, Blackwoods, Fonthiesburg; J. Pierce, Heilbron.

Official Graders.—T. A. Westbrook, Durban; P. Rose-Innes, Capetown; C. H. Kest, Laurens, Marques.

Upon the motion of the Director of Agriculture, O.R.C., it was agreed that Sir Thomas Price should take the chair.

The Conference was opened by the Minister of Agriculture for the Orange River Colony, General De Wet, who delivered an interesting address. After welcoming the delegates, General De Wet said that the question of export, not only of maize, but of any kind of grain they might eventually export, was of the utmost importance to South Africa. They all knew many difficulties stood in the way of export of maize, and the greater obstacles were experienced at the Coast when maize arrived from up-country in a wet condition. Many difficulties arose with regard to the speedy shipment at the Coast and the shipping freight to Europe. There were representatives at the Conference from all Colonies, and they would be able to give the Government a lead and suggest how to arrive at the most satisfactory arrangement with regard to shipping freights. He spoke on behalf of the Governments of South Africa when he said that there was a desire to have their maize exported by no other lines than by the English ones. (Hear, hear.) But if his best friend would not meet him he would be obliged to go to the next best one. He hoped that the day was near when they could arrive at some arrangement with the shipping companies which would be satisfactory for the whole future. Another burning point was the exportation of wet maize. He would remind them in this respect that, just as there were irresponsible farmers, so there were also irresponsible merchants, and especially the smaller traders and speculators in the country districts who went around to buy up maize. The regulations with regard to export should be so stringent that if a man had once sent wet maize to the Coast he would never do so again. He was not afraid that strict regulations would harm the export trade. His idea was that they must not only

CONFISCATE WET MAIZE.

but also impose fines on the senders.

Proceeding, General De Wet said he was glad that the new methods employed in other countries were beginning to take root in this country and were going ahead rapidly. The experiments taking place close to Bloemfontein, in one of the driest districts, showed that South Africa could produce an enormous quantity of maize. He thought the Conference had not been called together one moment too early in order to make the best arrangements for the exportation of maize. He wished them all success in the important work before them. The various Governments would, as far as was in their power, give the resolutions of the Conference their earnest consideration. (Loud applause.)

The Chairman (Sir Thomas Price) followed with a few remarks; and the Conference then proceeded to business.

The first matter to be discussed was the question of the

PRODUCTION AND HARVESTING OF MAIZE FOR EXPORT,
best varieties to grow, grading on the farm, etc.

Mr. M. Joubert (Bloemfontein), introducing the subject, said that the most important point for the producers was the sowing of pure seed. The Agricultural Departments should be the centres from which pure seeds were distributed. Sometimes it happened that the farmers did not always get value for their money from the merchants. Cultivation was another important question in the production of maize, and early ploughing was essential. Farmers did not always discriminate between the different sorts of maize, and up till now many merchants had not done so. The sooner the merchants and the farmers came to some understanding the better it would be for both of them.

Mr. J. Moon (Natal) could not agree with Mr. Joubert. The graders had never complained about the quality of the maize itself. The chief point to be discussed was the production of maize, and it rested entirely with the farmer what kind of mealies he grew. The farmer had to find out for himself which variety was best suited for his district. He must be educated to produce a good, clean, separate kind of maize and not to grow mixed colours.

The Chairman pointed out that first of all they had to arrive at a resolution about the best kind of grain. It was their purpose to induce the production of such grains which would command the best prices, and which at the same time combined those characteristics which were most required in the market they had to supply.

Mr. J. B. de la Harpe (Fouriesburg) said that the earlier farmers could plough the better it would be, but as a rule they had no early rains. They would not get the farmers to grade the varieties on the farm before railing, but they would induce them to grow separate kinds. There was so many different conditions and circumstances of climate and soil that it was impossible to lay down a hard and fast rule. It was far better to leave it to the farmer to select the variety which was most suitable to his particular conditions.

Mr. B. Enslin (Pretoria) said they could not go into details with regard to production and the selection of varieties of maize, because the climates were too different in the various Colonies. The farmer must endeavour to supply those varieties most wanted by the European market, but they should grow as few varieties as possible. The Agricultural Departments should send round men to educate the farmers and show them which varieties were most in demand, and assist them in selecting the particular kind which was likely to give the best yield under the particular circumstances.

Mr. A. Lewis (East London) said that the merchants were quite cap-

able of supplying the farmers with the seed they required, and he opposed the idea that the Agricultural Departments should distribute seeds.

Mr. H. Stanley (Wepener) thought that this Conference should recommend farmers to sow maize by drill and not by hand.

Mr. J. Pierce (Heilbron) agreed that the farmers should be encouraged to sow with drills and improve their methods of cultivation. With regard to varieties, he thought that the Hickory King was one of the most productive in the northern districts, but it had to be put in early. The white and yellow Congo were also very good yielders. It was not desirable, however, to specialise, and what was suitable for one part of South Africa did not suit another. His experience was that any good and sound maize would find a ready market.

Mr. K. Spilhaus (Capetown) said that white flat maize had commanded, as a rule, the best price in the European markets, but on the other hand, yellow round maize was worth more on the Australian market than white flat. Therefore the market prices often fluctuated, and the demand for the various qualities was continually changing, according to the country buying. Mr. Spilhaus further stated that Basuto mixed fetched a higher price in the European market at the commencement of the season than round yellows.

Mr. J. Burt-Davy (Pretoria) held that the farmer should grow the variety which gave the heaviest yield in his district. From the farmers' point of view it was the best to stick to one colour. The Transvaal Agricultural Department was constantly bringing in new blood; its object was to get earlier maturing varieties and good yielders. The Transvaal Government had recently imported twenty-five new varieties and they were now experimenting with these. The longer a variety was grown in a certain district the better it acclimatised and the better the results obtained.

Mr. W. J. Palmer (Director of Agriculture, Bloemfontein) pointed out that in the past the farmers had produced for local consumption and all they had to do was to grow good, sound maize. Now, however, they had to cater for the European market, and had to look to the taste of the oversea consumer. Henceforth they had to cater for a critical set of buyers and so compete with the American producers. The great difficulty was to get pure seed. He thought it the duty of Agricultural Departments to assist the farmer in this direction. There should also be a system of grading on every farm. The time would come when the best only could go oversea. He did not suppose that they could come to any resolution on this matter, but he only put it on the agenda to have an interchange of opinion on the subject.

Mr. W. A. McLaren (Verconiging) dwelt on his experiences as a maize grower. As far as ploughing was concerned, it could not be done



PEAR TREE AT WEENEN EXPERIMENT STATION.

(Photo taken in March, 1910).

too early. At the present time for instance there was no special work to be done by the oxen and they could be employed to break up the land. A farmer should grow maize on the land one year, then plough it up and fallow it for one season before putting in another crop of maize. Every farmer should find out as soon as possible what variety could be best produced on his farm. It was not for this Conference to decide upon this question. The farmer would soon find out which variety paid him best, and it could be left to him to make a selection as long as the variety was sound and pure. They further had to try to make the cost of production as low as possible.

Mr. J. Moon (Natal) said the maize growers in Natal could not give effect to the methods advocated by Mr. McLaren. It would be all right in the case of very large farms to leave the lands idle for two years, but this was impracticable in Natal.

Mr. J. Burt-Davy (Pretoria) maintained that the method advocated by Mr. McLaren was the best. Land should not be continuously used for maize production. It was not necessary to leave the field idle in the meantime; other crops could be grown on it. Referring to the Hickory King variety, he said its area of profitable cultivation was strictly limited on the extreme high veld. Though Hickory King was much in demand, it was not suitable for all requirements of the trade. He recently sent samples of the best Hickory King to a big manufacturing firm in England and asked for a report. The reply was that the sample did not meet the requirements of that particular trade, because the proportion of starch was too small.

Mr. R. W. Thornton (Capetown) said that one of the most important points was that farmers should increase the production of maize per acre, and so cheapen the cost of production. With regard to the wholesale importation of seed, he did not think the Government should undertake this work and so come into competition with the seedsmen, whose legitimate work it was. The Government should continue to distribute samples of different varieties. The farmers, through their societies, could get the merchants to submit samples of seed, which could be tested by the department, and the merchants could then sell in bulk to the farmers according to the sample submitted. Later on farmers would be in a position to breed pure seed themselves.

Mr. A. Koeling (Johannesburg) held that the Agricultural Departments should go on with their experiments, and supply small quantities of pure seed to applicants. The Government, however, should not enter into competition with farmers, many of whom made it their special business to sell pure seed. It was advisable for every farmer to restrict himself to one particular variety. If more varieties were grown all would agree that strict separation was necessary.

The Chairman remarked that they had to grow maize for sale, and so far they had not had much information about the character of the maize that was most in demand. Would Mr. Keeling give his opinion as to the most marketable variety?

Mr. A. Keeling, in reply, said that, taken all round, the white flat and yellow round had commanded best prices.

Mr. G. Hobson (Maseru) recommended early ploughing. The farmers should plant as early as they could, and use drills in preference to sowing by hand. On many farms they could already see the beautiful, straight rows of maize plants. If a farmer had once found out which was the variety of maize most suitable to his soil and climate he should stick to it. In this respect the Agricultural Department would always give him advice, but he had to go to a certain extent by his own experience. He was a farmer himself, and considered that it was one of the easiest things to do the grading on the farm. Basuto mixed maize often fetched as much on the London market as the best varieties.

Mr. W. J. Palmer (Bloemfontein) moved:—

"This Conference recommends to the favourable consideration of the South African Governments the advisability of issuing a joint notification, to be renewed periodically to farmers throughout South Africa, giving: 1 (a) The descriptions of maize which experience has shown to be calculated to give the best yields in the several districts; (b) the best methods to be employed in preparing the land for sowing and the best methods of harvesting; (c) the descriptions of maize most in demand; (d) the disadvantages of mixing maize either as regards colour or quality in the same bag; (e) particulars as to the supply of pure seed and where procurable; (f) any other information calculated to be of service to growers and buyers. 2. That the different Departments of Agriculture issue small samples of pure seed to interested producers for experimental sowing, but that such distribution be limited to experiments only, so that commercial interests will not be interfered with."

Mr. J. Pierce (Heilbron) seconded.

Mr. S. Seruya (C.F.L.M.) said the great difficulty the Mozambique Agricultural Department had to contend with was that the growing of maize was to a great extent in the hands of natives. Any resolution, however, this Conference would make would have the careful consideration of his Government and would be carried out as far as possible.

The Chairman said he thought the resolution moved by Mr. Palmer crystallized the current of the discussion. The subject was fully discussed and he would put the resolution to the vote. The resolution was carried unanimously.

Mr. K. Spilhaus (Capetown), in further explanation, stated that he had not advocated the growing of mixed maize. He had only referred

to Basuto mixed maize to show the extent to which prices fluctuated.

The following are the other resolutions moved and finally adopted by the Conference:—

GRADING.

(1) APPOINTMENT OF GRADERS.

• “This Conference recommends that in order to secure uniformity of practice and standards, immediate measures be taken to place the grading of maize under one authority, and that for giving effect to this object a Chief Government Grader be appointed, with assistants, solely in Government employ, at the ports and inland centres.” (Moved by Mr. N. Lewis, East London.)

(2) GRADING STANDARDS.

Mr. Ehrlich (Bloemfontein) moved:—

“This Conference recommends that a committee be appointed annually to meet at a time to be notified by the Union Minister of Agriculture for the purpose of deciding the standard grades for each year, such committee to consist of one representative from each Province to be nominated by the Associated Chambers of Commerce, one member of the Agricultural Department of each Province to be nominated by the respective Governments, and one member representing each Province to be nominated by the South African Agricultural Union.”

The Conference was further of opinion that the committee recommended in terms of the above resolution should be appointed in the first instance as early as possible, so as to enable the required regulations and certificates to be issued in good time for application at the outset of the approaching maize shipping season. The Conference also suggested that such committee be empowered to consult the representatives of the shipping, mercantile, agricultural, railway, and port interests, as it may deem necessary.

With a view to giving effect to the foregoing suggestion, the Chairman was authorised to communicate with the respective Governments on behalf of the Conference urging them to arrange—in anticipation of Union—the appointment of the committee.

Mr. H. A. Light (Natal) moved:—

“This Conference recommends that the committee referred to in Resolution 3 [previous resolution.—Ed.] also deals with: (a) Reduction or otherwise of present standards; (b) The advisability of one standard being selected for each grade; (c) The percentage of sound grain necessary; (d) The annual distribution of standard samples in South Africa, Great Britain, Europe, and other purchasing countries; (e) That it be an instruction to the said committee that it should ascertain from the European markets the grades most acceptable, and decide accordingly.”

GRADING AT PORTS.

Upon the motion of Mr. K. Spilhaus (Capetown) it was agreed that:—

"This Conference recommends that it be an instruction to the Official Grader that every bag must be examined at the port of shipment before granting a certificate."

STANDARD OFFICIAL DOCUMENTS.

The Chairman moved:—

"This Conference recommends that a form of certificate, applicable to all ports, in connection with the export of maize, shall be prepared by the committee referred to in Resolution No. 3 in consultation with the Chief Grader. Any certificate to be issued must bear no alterations or erasures. The committee should further consider the advisability that all certificates be filled in with ink or typewritten."

This was agreed to.

BAGS.

It was agreed that the Chairman should obtain information relative to the correct methods of sewing up bags, and that he have diagrams prepared for the information of producers.

Mr. A. Keeling (Johannesburg) moved:—

"This Conference is of opinion that old or second-hand bags shall not be used for export purposes, and also urges that at least 2½-lb. reputed weight shall be insisted upon for the present, but that actual 2½-lb. bags of A quality twill, or heavier bags if necessary, be used at the earliest possible date; such bags to be of a given measurement to carry 200 lb. of maize."

This was seconded by Mr. M. J. Joubert (Bloemfontein) and agreed to.

Upon the motion of Mr. B. Enslin (Pretoria) it was agreed that:—

"This Conference recommends that the contents of bags of maize be limited to 200 lb."

MARKS AND CERTIFICATES.

The committee appointed to report upon the question of marks and certificates recommended the adoption of the following suggestions:—

(a) That the various grades and sub-divisions thereof be indicated by running numbers from 1 to 15, such numbers to be stencilled in red and placed in a circle on the upper side of the mouth of the bag.

(b) That the leading mark and the port mark be one, and that the shipping companies be requested to submit to the committee appointed as per Resolution 3 the lettering they desire adopted for the different ports of discharge.

(c) That a uniform system of stencilling or stamping be adopted for marking purposes, such to be decided by the Chief Grading Officer.

(d) That the following colours be adopted by the several ports of shipment for indicating the port marks:—

Delagoa Bay	Black.
Capetown	Blue.
Port Elizabeth	Red.
East London	Green.
Durban	Yellow.

(e) That it be optional for full truck loads of one grade, from one consignor to one consignee, to be sent without sender's marks.

(f) That all particulars stated on the grader's certificate, also appearing on the bill of lading, shall be identical on both documents, which must also bear the same date.

(g) That the railway and harbour authorities shall provide the proper facilities for correct weighing at the ports and shall issue weight certificates to the shippers when requested, and that it be an instruction to the port authorities not to issue such certificates unless the trucks have been retared.

(h) That it be a recommendation to the committee referred to in Resolution 3 to frame uniform certificates to be issued for grain passed or reected by the Government graders at the several ports.

These recommendations were finally adopted by the Conference.

SHIPMENT OF UNFIT MAIZE.

Mr. W. J. Palmer (Bloemfontein) moved, and it was agreed without discussion that—

“In the opinion of this Conference it is not advisable that reduced rates for maize apply to certain months of the year only.”

The following resolution, moved by Mr. K. Spilhaus (Capetown), was also adopted:—

“That maize railed apparently in sound condition, which was found to be slightly weevily on arrival at the port, be allowed to be shipped at export rate, providing the shipping companies were willing to accept same.”

MINIMUM CONSIGNMENTS.

Upon the motion of Mr. J. Moon (Natal) it was agreed that—

“This Conference recommends that the present arrangement as to the 100-bag minimum consignment should continue.”

RATES AND FREIGHTS.

The following three resolutions were carried:—

(1) “This Conference recommends that the export rate of 10s. per ton of maize shall apply to all South African centres represented at this Conference where the export rate does not amount to less than 10s.”

(2) “This Conference urges the necessity of similarity of practice

being introduced at all South African ports, together with the services performed at each in regard to the export of maize oversea."

(3) "This Conference, having heard the views of the representatives of the steamship companies, desires to urge upon the several Governments and upon the Union Government the seriously prejudicial effect any increase of shipping freight will have on the production and export of grain; this Conference therefore resolves to urge upon the Governments to take such measures as may be necessary to ensure, if possible: (a) Maintenance of the present freight; (b) Sufficient ship tonnage to carry the maize traffic; (c) Opportunities to ship directly to other leading ports in the United Kingdom and the Continent, in addition to the present ports of landing; and (d) A contract for at least three years to fix these conditions."

STATISTICAL BUREAU.

The following resolution, proposed by Mr. A. Keeling (Johannesburg), was carried without discussion:—

"This Conference recommends that a properly constituted statistical bureau be at once inaugurated and an expert appointed. This bureau to provide statistics of acreage planted, report monthly on seasons and probable yield of crops, and show extent of South African consumption, estimates of final yield and of exportable surplus, the estimates to cover also native crops and monthly statistics of quantity exported, etc."

STORAGE OF MAIZE.

Mr. J. B. de la Harpe (Fouriesburg) moved:—

"This Conference is of opinion that maize for export should be stored up-country as long as possible, and that for this purpose the Government should be requested to erect covered storehouses but open at the sides at the chief grain-exporting railway stations for the convenience of farmers and merchants, and that a charge be made for storing and holding grain to cover the cost. Regulations to be made so that grain cannot be held in such stores for speculative purposes."

Mr. W. J. Palmer (Bloemfontein) seconded, and the motion was adopted.

GRAIN ELEVATORS.

The following resolution was carried:—

"This Conference having heard the views of the representatives of the steamship companies regarding the erection of elevators recommends that, before any decision be taken, exhaustive inquiries, preferably by the appointment of competent persons visiting Argentine, the United States, Canada, and Russia, be made by the Government."

CHECKING OF BAGS BY RAILWAY.

Mr. K. Spilhaus (Capetown) moved:—

"This Conference is of opinion that it is desirable that arrangements be made by the railway authorities to check (if requested by sender) the number of bags loaded, even if extra expense has to be incurred by the individual desiring such service. The department in such instances to accept responsibility for numerical shortages."

The resolution was carried.

COMMITTEE FOR GRADING STANDARDS.

Mr. B. Enslin (Pretoria) moved:—

"That this Conference is of opinion that the committee recommended in Resolution No. 3 be appointed as early as possible, so as to enable the required regulations and certificates to be issued in good time for application at the outset of the approaching maize shipping season.

"The Conference also suggests that such committee be empowered to consult the representatives of the shipping, mercantile, agricultural, railway, and port interests, as it may deem necessary.

"With a view to giving effect to the foregoing suggestion the Chairman is authorised to communicate with the respective Governments on behalf of this Conference, urging them to arrange—in anticipation of Union—the appointment of a committee."

After some discussion the motion was carried, and the matter left in the hands of Sir Thomas Price.

MAKING MEAD.—Mead or honey wine is a most charming drink, and at the same time, most wholesome. Mixed with soda or other mineral water, it makes a nice refreshing summer beverage. Rather than spoil a trade obtained by selling first-grade honey, use inferior quality in the making of mead. Here is a recipe that will produce a sample equal to others that have taken a gold medal and other special prizes. Put in six gallons of water twenty-four pounds of honey. Boil half-an-hour, removing the scum as it rises. Add three ounces of hops, boil again for fifteen minutes, strain into a cooling vessel, and when luke-warm stir in six tablespoonfuls of brewer's yeast. Let it work twenty-four hours, then remove the head and put into a five-gallon cask into which has been put a bottle of brandy and two lemons sliced. Leave out the bung and allow it to work over, filling up with spare liquor. Bung down when working ceases, and bottle in two years. For larger or smaller quantities use the proportions as follows:—1 gallon water, 4 lbs. honey, $\frac{1}{2}$ oz. hops, 1 tablespoonful yeast.—*Journal of the Jamaica Agricultural Society.*

Shield Budding the Mango.

By J. E. HIGGINS,

*Horticulturist, Hawaii Agricultural Experiment Station.**

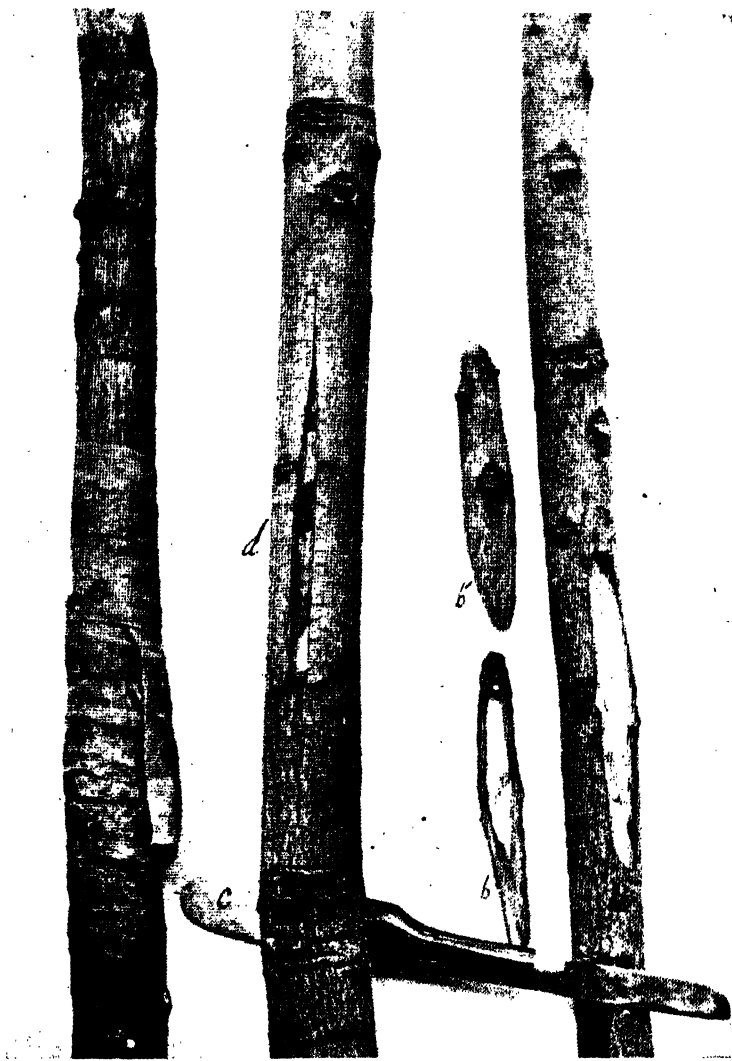
THE possibilities of the mango as a tropical fruit for the world's markets are gradually being appreciated. Since it has been demonstrated that the fruit can be successfully shipped long distances in refrigeration, and since the fine varieties have become more widely known, a new interest is being awakened in the fruit. Already the Agricultural Departments of several tropical countries are devoting attention to the development of the mango as a fruit industry and commercial orchards are being planted. It is confidently expected that the next decade will be marked by a large increase in plantings.

One of the most pressing problems that presents itself for solution at the beginning of this development is to find an expeditious method of propagation, seeds being no more reliable in the production of excellent varieties than in the case of most other tree fruits. Very considerable progress has been made in the working-out of this problem. In very early years, before the commercial side was seriously considered, the first step was taken in India by the application of inarching to the mango. This consists essentially in grafting scion to stock while each continues to be supported by its own root system. It is cumbersome and, except for special purposes, is too slow for commercial use. A great step in advance was made by Oliver(*a*) and by Knight(*b*) in adapting patch budding to the mango. By this means it became possible to plant seedling trees in orchard form and later bud them to desired varieties. The method, however, requires considerable dexterity and can be successfully applied only when both bud-wood(*c*) and stock(*d*) are in flush, a condition which frequently does not exist in both members at the same time. It is the hope of adding some small increment to the knowledge of mango propagation that the following results are offered.

DESCRIPTION OF METHOD.

The proposed method is new only in its modifications and in its application to the mango. It is merely shield budding with an inverted "T," adapted to the peculiarities of the mango. Shield budding is probably one of the oldest, and certainly the most widely practised, of all methods of budding. Ordinary shield budding had been tried on the mango long ago, following the general practice in the selection of bud-

* This article appeared originally as Bulletin No. 20, of the Hawaii Agricultural Export Station.—Ed.



SHIELD BUDDING THE MANGO.

Showing how the process of Shield Budding is adapted to the Mango Tree.

(See Article).

wood and stock that govern in the shield budding of citrus fruits, peach, or plum. In this case young bud-wood was used with the leaf still attached, and it was inserted in young wood. It soon became apparent, however, that this method would not work successfully, and it was abandoned, giving place to the patch bud, spoken of above, which was practised with more mature bud-wood and stock. The present method consists in using wood of the same maturity as in patch budding, but adopts the similar device for bringing the bud shield into contact with the stock, known as "shield budding" with an inverted "T" incision.

MATERIALS AND TOOLS NECESSARY.

The materials and tools which will be found most convenient in performing this work are the following:—(1) Budding-knife with bone handle to raise the bark; (2) raffia; (3) grafting wax; and (4) waxed cotton bandage. The budding-knife will be necessary to make the incisions, and the bone handle to raise the bark. The raffia has a special advantage as a tying material in that it holds firmly for the few weeks necessary, and without cutting the bark. It will also decay or be broken by the expansion of the stock under the waxed bandage. It can be obtained from dealers in gardeners' supplies. If only a few buds are to be applied, other soft but strong tying material may be used. The wax may be prepared according to the following formula: Beeswax 2 parts, resin 4 parts, beef tallow 1 part, by weight; break these into small pieces, place them in any pot or tin container and melt them over a slow fire. When they have become thoroughly liquified, remove from the fire and pour into a bucket of cold water. When sufficiently cool to be handled, apply tallow to the hands and pull the wax like candy until it has acquired a good grain and light colour. The bandage may be made by dipping strips of cotton in bees-wax liquified over a slow fire. These strips of cotton are usually made as wide as can conveniently be placed in the vessel containing the wax. When removed and cooled, the cotton may be rolled and cut off in pieces of any desired width. Strips about three-quarters of an inch to one inch wide are found convenient for this work.

THE STOCK.

Budding by this method has been successfully performed on stocks from an inch to three inches in diameter. What the limitations are, on either side of these dimensions, is not known at present. Wood of this size, in seedling trees, may be from two to five years old. It is essential that the stocks be in a thrifty condition, and, still more important, that they should be in "flush." If not in this condition, the bark will not readily separate from the stock. It has been found that the best time is when the terminal buds are just opening. Unless the trees are watched carefully they will pass this stage before the flush is observed. When the

THE BUD-WOOD.

The bud-wood which has been most successfully used is that which has lost most of its leaves and is turning brown or gray in colour. Such wood is usually about an inch in diameter. It is not necessary in this method of budding that the bud-wood shall be in a flushing condition, although it may be an advantage to have it so. It should, however, be healthy wood of normal growth.

THE INCISIONS.

The incisions should be made in the stock about six inches in length. At the lower end of this make an incision at right-angles to it, with the knife edge pointing upwards at an angle of about forty-five degrees with the stock, thus making a curved incision. Insert the sharpened end of the handle of the budding-knife beneath the bark at the junction of these incisions, and push it gently upward, raising the bark so as to make a place for the bud. It is not necessary to push the handle far, but, by gently prying, the bark may be separated from the stock, if the latter is in proper condition, without injuring the delicate cells against which the bud shield is to be placed.

THE BUD.

The bud is now to be removed from the bud-wood. With a rather heavier knife than is generally used for budding, in the right hand, and the bud-wood held firmly in the left, place the blade against the bud-wood with a very slight inclination, and cut so as to make as flat a surface as possible under the bud shield. This bud shield should be about 3 to 3½ inches long, with the bud in the centre. The small portion of wood, which will thus be taken off with the bud shield, may be removed if it slips readily. If not, it should be left in place. The lower end of the shield is then taken between the thumb and finger and gently inserted in the incision prepared for it, pushing it up until it is held firmly in place by the surrounding bark.

TYING AND WRAPPING.

The stock must then be tied with raffia or some other soft, but strong, tying material, so as to prevent drying out. The cut surfaces below the actual bud are usually covered with grafting wax, and the whole is then wrapped with a waxed cotton bandage, beginning at the lower part and winding spirally to the top, exposing only the actual bud. This method of wrapping protects the bud and the wound from the access of water. The bud is shaded by a short piece of bandage hung over it and held in place by being laid under the upper strands of the spirally wound bandage.

AFTER-TREATMENT.

In about three or four weeks, if the bud remains green, the stock should be lopped at a point about seven inches above the bud. Care

should be taken in thus cutting the stock partly off to avoid splitting downward. It should be made to split upward into that portion of the stock which is to be destroyed. This looping will serve to force the bud into growth. Many of the buds, on the sides of the stock, will start into growth before the new bud. These must all be cut off. It has not been found necessary to remove the tying and wrapping material until the bud has made two flushes, and often it is not necessary at all, since the raffia usually decays beneath the waxed cloth, and the latter naturally expands with the growth of the stock. When the bud has started into growth the top of the tree may be completely cut off and destroyed. The stump remaining above the bud may be cut off with a sloping cut close to the bud, after the latter has made three or four flushes.

ADVANTAGES OF THE METHOD.

SPEED.

It has been found that buds can be set quite rapidly by this method. In the experience of the writer, five or six buds could be set by this means to one by the patch bud method. Speed may be increased also by the use of unskilled labour in the tying and binding operations. The operator can set the bud and pass on to the next without any danger of it getting out of place before the helper, who immediately follows, ties it.

Perhaps the most important advantage in this method of budding lies in the fact that it may be used successfully when the bud-wood is not in an active growing condition. The most tedious part of patch budding is in removing the bud, and frequently in doing so it will be broken. Further, it is frequently impossible to get bud-wood of a desired variety in active condition when the stocks are ready to be operated upon.

ADAPTABILITY.

The method may be applied most advantageously to seedling trees in orchard form when they have become large enough to be operated upon, when the buds should be set only a few inches above the ground. It may also be used in top-working old trees to new varieties. For this purpose, the main branches of the trees must be cut down to a point about two feet from the trunk. The cut surface of the wound should be painted with ordinary lead and oil paint to prevent drying out and checking. The remaining stumps will send out numerous young shoots, and from these a few may be selected for budding. The others should be broken off before they have made growth so as to throw the vigour of the tree into the selected shoots. When these new branches have arrived at the condition described above, buds may be inserted in them to form the new head for the tree. It is better not to cut off all the large branches the same year.

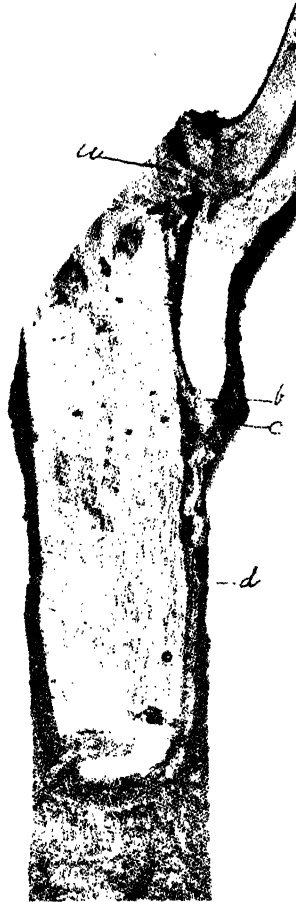
It is too early to report the results of this method as applied to nursery trees, but from the experience at this Station it seems highly probable that the method would be applicable in the nursery also. Seedling nursery trees, of several years' growth, have been successfully transplanted by severe cutting back. In all probability, nursery trees budded as early in the growth as possible, and near to the ground, could be successfully removed a year or two after budding. Nevertheless, it is recommended as better practice to plant out young pot-grown seedlings, budding them as soon as they have become of sufficient size.

STUDY OF THE BUD UNION.

THE REGION OF UNION.

It may be unnecessary to point out the region of union between the bud and the stock, but from the widespread misconception of this subject, it is believed to be necessary to draw attention to some facts in this connection. For example, in budding with a patch of bark inserted into an opening of the same size in the bark of the stock, it is quite commonly misconceived that the union takes place along the edges of the bud patch, uniting the latter with the bark of the stock. This, however, is not the case. Union is effected in a more or less broken ellipse, corresponding to the line between the bark and the small portion of wood adhering to the bud shield. A moment's reflection should serve to show that this is the only region where it is possible for a union to be effected. The cells of the wood are too old and inactive to take any part in a coalition with any plant substance with which it could be placed in contact. Likewise, the cells of the bark are too old to unite with other plant substance. It will be recalled that the region of growth lies just between the bark and the wood, and that this thin layer of cells is known as the cambium. The cells in this part are thin-walled, tender, and in process of subdivision. When this cambium layer, lying between the bark and the small piece of wood, is placed in contact with the cambium of the stock, and is held there for a considerable period, the new cells forming by the subdivision of the cells placed in contact constitute a continuous layer through stock and bud. The small portion of wood, held within the bud shield, dies and becomes dried up.

When the incisions are made in the stock to prepare a place for the insertion of the bud shield the bark of the stock separates from the wood along the line of the cambium zone. When this bark is again pressed down upon the bud shield at its edges and into place against its own cambium, union again takes place more or less completely along the zone where it has been separated. The bud shield, however, will prevent the wings of the bark of the stock from returning perfectly into position. A region will, therefore, be left surrounding the bud shield where no



SHIELD BUDDING THE MANGO.—III.

Section through a Mango Bud Union after several flushes have been made.

(See Article).

union can be effected between two layers which were in contact before the budding operation was begun. This leaves a zone in the form of an ellipse surrounding the bud shield and on which all the surface cells have become dry.

Since, however, the bud shield which is united with the stock is in vital contact with it and is drawing its sustenance from this source, there must be a continuous layer of active cells beneath those that have become dried; otherwise there would be no possible means of communication between the bud branch and the stock.

MODIFICATION OF CELLS DUE TO THE BUD.

If a mango branch be examined it will be observed that numerous buds are to be found—one in the axil of each leaf, and one above each scar where the leaf has been dropped. Nearly all of these buds remain dormant. If the branch is split through the centre, it will be found that the bud, as in the case of most dicotyledons, is connected with the centre of the branch by a thin line of pith. Nearly all the elongation of cells takes place in the direction of the growth of the main branch, but a few bundles are elongated toward the dormant bud. If this branch is cut off just above one of these buds, the latter will be forced into growth. The flow of sap toward the newly developing bud will cause the elongation of the cells toward the new bud. In other words, the grain of the wood will be changed in direction.

If a new bud from some other tree be inserted under the bark of this branch, and if union takes place, a corresponding change in the direction of the grain will take place. There will be this difference, however, that there will be no central pith connecting the new bud with the centre of the main branch. When union is first effected, as pointed out above, it is in a more or less broken ellipse along the line of the cambium zone, lying between the bark of the bud shield and the small portion of wood beneath it. At this point of union it may often be seen that the elongation of cells takes place in a direction at right angles to the natural grain of the wood of the main branch. As growth continues the newly forming cells become less and less sharply angled at, or near, the point of union, and gradually assume the direction of the new branch. If a budded branch of a few months' growth be cut through longitudinally, the old line showing where the bud was applied may readily be seen, covered by new layers of wood. These layers are continuous between the new branch and the stock. It will be understood that they are also continuous in the circumference of the stock and branch. Each year, as new layers are added, the line between the bud and the stock becomes the more deeply embedded in the tree. In this way the new growth completely surrounds the old, and the new tree top becomes as firmly attached to the stock as one of its own branches would have been. A careful study

of these mango bud-unions leads to the belief that no fear need be entertained as to their strength.

A similar change in the direction of the grain, frequently takes place under the wings of bark which have been replaced after the insertion of the bud.

AN ADAPTATION OF INARCHING.

In relation to the matter of propagation it may be well to mention here an adaptation of inarching which has been found very useful. It has been stated above that inarching is a cumbersome and tedious process for the multiplication of a variety. Nevertheless, there are cases in which it can be made to serve a valuable purpose. Frequently this station has received inarched potted plants. It has been found that these often fail to do well when planted out. Sometimes the root-system has been too long confined to the pot, or long transportation has reduced the vitality of the tree. Such trees are no longer planted in the station orchards on their own roots, but are grafted by inarching to the side of a strong seedling already in the orchard row. For this purpose the pot is sunk in the soil close to the seedling and only a small portion of the potted tree need be grafted to the new trunk. After the union has been effected the pot plant may be taken to another tree if desired, and the process repeated. By this simple adaptation a shoot only a few inches in length has been made to produce a tree top of 5 feet spread and 4½ feet height in less than a year.

Dairy farming will not maintain soil fertility for ever when nothing is fed but that produced on the farm.

The danger of wasting soil fertility lies in the fact it takes place so slowly no account is taken of it until too late.

The pig is raised only for its meat, and this being the case, the object is best subserved by turning it into meat as soon as possible.

Disease germs are present on nearly every farm. The best way to fight them is to keep the stock in a healthy condition.

The brood sow must not be fed heating food the first three days after farrowing. To do this is to invite caked udders or milk fever, and kill the pigs.

Caponising.

HOW THE OPERATION IS PERFORMED.

WE have received from a reader of the *Journal* a request to be supplied with some practical details of the art of caponing or caponising—i.e., the operation necessary to convert cockerels into capons with a view to increasing their growth—and as some description of the operation will doubtless be found of value by many of our readers, we publish herewith the best information on the subject, in a condensed form, which has come to our notice. The article which we have drawn upon for the details that follow was published in the December, 1909, number of the *Illustrated Poultry Record*. An illustration is published in conjunction with the article, showing the instruments, etc., required by the operators, and as the illustration itself is not sufficiently clear for reproduction in these pages we may describe the appliances it depicts. First, two half-bricks are required, with cords attached, for holding down the bird; then there is a short-bladed pocket-knife, a pair of wire spreaders for opening the wound during the operation (a piece of wire several inches long is taken and bent in the centre to a *complete* circle—a circle and a half, really—the ends of the arms being left at a short distance apart and the tips of them bent inwards: the circle itself acts as a spring to keep the arms apart), sponges made of cotton wool twisted around the ends of matches, forceps for taking hold of the testicles (these are made in much the same way as the spreaders), and a surgical needle and silk for stitching wounds. Besides these appliances, a table about 2 feet 6 inches wide, a bowl of very cold water in which a few grains of permanganate of potash have been dissolved, and a couple of clean dusters, are required.

As the object of caponing is to make large birds, only those which belong either to the table or the general purpose class should be used. Cockerels from ten to twelve weeks old are best for the purpose. As the abdominal portion of the body has to be opened, it is advisable to starve the birds for twenty-four hours so that the intestines may be practically empty.

The cockerel is taken, and the noosed end of the cord attached to one half brick is passed over the wings and tightened at the shoulders; the other is fastened round the legs above the hocks. The bricks are then dropped over the sides, the left side of the bird resting on the table. The area which has to be plucked is doused in cold water, and the feathers are pulled out. The effect of the cold water is to deaden the sensitiveness of the skin, and thus the bird hardly feels any pain. One of the

dusters is now taken, soaked in cold water, and folded so that it forms a strip some two inches wide, and this is placed over the feathers in front of the plucked area.

The most difficult part of the operation is to locate the exact position for cutting. Great care must be exercised in finding it. To describe it, we must touch on the question of the anatomy of the fowl. There are seven ribs on either side, springing from the back bone. The first two of these, counting from the front of the bird, are loose ribs—that is, they are only attached to the back. The remaining five spring from the backbone, take a backward direction at first, then turn at an angle of about 120 deg., go forward and join the sternum. It is only with the two last ribs on either side—those nearest the thigh—we have to deal, and in the case of, say, an Orpington at twelve weeks old, the section attached to the backbone is about $1\frac{3}{4}$ inches long. The cut has to be made between the two last ribs from the backbone to the point where they turn to go forwards. The membrane which separates the thoracic from the abdominal section of the body is attached to the sixth rib, and therefore if the cut is made between the fifth and sixth ribs the lungs will be touched, and it will be next to impossible to take out the testicles. Cutting into the thoracic portion of the body, and even cutting the lung, does not often cause death, but as a second cut will be necessary on the same side great care should be taken to find the exact position at first.

Pass the first finger of the left hand, commencing at the thigh, towards the front of the bird until the seventh rib is reached, pass over this, pressing the nail between it and the sixth rib just about midway between the backbone and the angle of the ribs. Holding the finger firmly in position, the point of the knife—with the cutting edge towards the breastbone—is inserted to a depth of half an inch and a cut made to the angle of the ribs. With the finger still in position, the knife is taken out, turned round with the cutting edge to the back, re-inserted, and, removing the finger, the incision is continued with the knife vertically until the backbone is reached. The reason for holding the finger between the ribs during both cutting operations is that, the skin being loose, it may move and the cut be made in the wrong place.

The spreaders are next inserted, the seventh and sixth ribs being held in the two hooks of that instrument. Surrounding the organs in the abdominal portion of the body is a fine membrane. It may happen, and we generally succeed in doing it, that this membrane has been already severed by the first cutting; if not, the knife must be again used, but with caution for it lies very close to the intestines. If there is sufficient blood in the body to make the organs indistinct, this should be soaked up by means of the sponges. In all probability, if the bird has been well starved, the right testicle will be in view. It is a small bean-shaped

-organ, yellow in colour, and is attached to the backbone. If not, by means of the forceps, the intestines should be pushed gently towards the breastbone, and this will bring it into view. Taking the forceps in the right hand, they should be inserted, slightly opened, with the ring blade towards the testicle, and a firm grip taken of that organ. With a half turn the connection is severed, and the forceps with the testicle withdrawn.

We have suggested that the cut in the first place should be made as large as the length of the ribs allow, and we believe it best for novices to do this, but it is advisable, after a few birds have been done, to make as small an incision as possible. With a large wound it is wise to put in one stitch to draw the skin together, and for this either a surgical or an ordinary needle, slightly curved, and white silk should be used. Only the skin must be sewn for if the flesh covering the ribs be taken up, the slightest movement of the fowl will tear it apart. When sufficient practice enables the operator to work with a small opening, it is better not to stitch the skin at all. A gas is given off from the inside of the body, and if the wound heals too rapidly the bird will become puffed up, and to allow for the escape of the gas the skin will have to be pierced.

To take out the second testicle the operation is repeated in a similar way on the other side of the body. As soon as the operation is over, the bird should be placed in a small coop littered out with clean straw. For a couple of days a small amount of food should be given five times a day. It is unwise to allow the bird to fill its digestive organs until the wound is partially healed. The best food we have found is soaked biscuit-meal, dried off with toppings or ground oats, with about 10 per cent. meat-meal added. After two days the bird can be given its liberty, but it is better if it is not allowed to perch for a few days longer. The birds recover very rapidly from this operation, and the death-rate is low. A proficient operator will not lose more than 2 per cent., and frequently a whole season will pass without any mortality at all. About five weeks before the Christmas demand commences the fowls should be picked up and fattened.

RICE PRODUCTION IN U.S.A.—The production of rice in the United States during the last few years is stated to have been as follows:—In 1901, 388,000,000 lbs.; 1903, 560,000,000 lbs.; 1904, 586,000,000 lbs.; 1906, 496,000,000 lbs.; 1907, 520,000,000 lbs.; 1908, 608,000,000. Louisiana produces 53 per cent. of the rice grown in the United States, and Texas 42 per cent.

Natal Agricultural Union.

PROCEEDINGS OF THE ANNUAL CONFERENCE.

(Continued from Page 428.)

THE following reports by the Government Bacteriologist (Mr. H. Watkins-Pitchford) and Chief of the Division of Entomology and Horticulture (Mr. Claude Fuller) were laid before the Conference:—

MR. FULLER'S REPORT.

CITRUS EXPORT.

The citrus export has now extended over three seasons, and in this experiment the Government has been the moving spirit, supplying the funds to enable the first, and conducting the second and third. The results are such as to justify the expenditure involved, and even to palliate the bitterness of losses experienced, because we now know exactly where we are in regard to citrus culture and export, facts which might otherwise have taken many more years to establish, and, perchance, not then altogether satisfactorily. It is to this phase of the question that I would now confine my remarks.

First.—The most important development has been the discovery of a form of citrus decay apart from the well-known green and blue moulds. The organism which plays this important role is new to science, and has but recently been investigated by the Transvaal Mycologist.

The development of this trouble goes a long way towards explaining the great amount of wastage which occurred in last season's shipment, and has a very important bearing upon the methods to be adopted in future. The decay is popularly named "Black Rot," and its structure, life history, and characteristics are fully dealt with in Science Bulletin No. 4 of the Transvaal Department of Agriculture, in which it is technically described as *Diplodia natalensis*.

The remarkable features of this new fungus pest are given by the Transvaal authority as follows:—

- (1) Natural infection can occur through the stalk end of the fruit, even after it has been plucked for as long a period as ten days.
- (2) A slight abrasion to the rind of healthy fruit (ripe or green) is sufficient to permit an entry of the fungus.

- (3) The fungus commonly gains its entrance to the fruit at its point of detachment from the stem.
- (4) The dangerous nature of the disease lies in the fact that fruit infected in the above manner may remain as long as 10 to 15 days before any signs of infection are apparent.
- (5) The disease is carried over from season to season by means of mummified fruits lying about the orchard.

From what little information I have been able to collect, it does not appear to me that the disease originated last season. What seems more probable is that it is some soil mould, probably indigenous, whose attack and prevalence upon citrus is subject to seasonable influences. There is every reason to believe that the late rains experienced had considerable bearing upon the outbreak, not perhaps to be attributed so much to the effect of the rains upon the development of the fruit, as to the distribution of the spores from the soil spattered up with the dirt into the trees, as is so much the case with Brown Rot in California.

I have ascertained that the disease is more prevalent in some orchards than in others, and it appears to be practically confined to the coast-belt.

Second.—The packing of fruit for export in one centre has, of course, never been seriously entertained by me. Our 1908 experience seemed to show that it was, to some extent, feasible, but under the strain and conditions of 1909 it broke down altogether.

If for no other reason, the discovery of the above-mentioned diseases calls for the abandonment of centralised packing of coast-grown citrus. Further, a central institution could never be made self-supporting under existing conditions, which have been put to the test, without penalising export.

Central packing-houses in districts devoted to oranges and removed from the coast belt, run upon co-operative lines, will become desirable in time, but anything of the sort for naartjes I cannot recommend.

Third.—The oversea export of lemons is sufficiently demonstrated to be unprofitable. In the culture of lemons for South African markets there is room for extension, but in this pursuit up-to-date methods in handling and curing are absolutely essential. The common rough lemon should be abandoned, and cut out from all commercial orchards.

Fourth.—The export of coast-grown oranges has proved too hazardous. The fruit produced under the prevailing soil and climatic conditions is exceptionally delicate, and will not stand the strain laid upon it. Taken as a whole, coast oranges, whilst of exceptional flavour, are not at all up to export standard. However, in size, colour, and carrying qualities, they may yet be improved by attention to manuring.

Fifth.—The export of upland oranges, especially from the Richmond-Maritzburg-Greytown belt, has been attended with success, and orange culture in this region will stand extension for export purposes, particularly as regards Navel oranges. Growers must be careful to select good sites, good types, and upon no account to plant seedling varieties in proximity to Navels.

For local markets the Du Roi (so called here) is proving a promising variety, chiefly owing to the lateness of its season.

Sixth.—The anticipations of building up a large export of naartjes gave no promise of speedy realisation. It can be said with much justification that, for the present, at any rate, the prospects of export do not warrant any unusual extension of the area under this fruit. In other words, with proper management, the orchards of to-day will meet the export requirements of some years to come at best.

The London market is limited so far as profitable prices are concerned, to what can only be regarded, from the export point of view, as a very small affair. It has further limitations, insomuch that the season of summer fruits thereupon coincides with the time of arrival of the bulk of the crop; prices tumble down rapidly, and then only the best quality of naartjes command a market.

There is, of course, no doubt that shipments of, say, one to three thousand trays per week, timed to arrive before and up to the advent of strawberries and cherries will prove profitable. Our early fruit most certainly carries the best, but naturally early shipments are limited. Subsequently, when naartjes are most abundant, exporters must be circumspect lest the fall in prices, bound to come about, swallow up their earlier profits.

PINEAPPLE EXPORT.

With regard to pineapple export, I regret to say that so far no development has followed upon the experimental shipments. Whilst it is hoped to do further work along this line in the near future, it must be said that it is a matter which rests almost entirely with growers.

It can be said with a great deal of assurance that it is only a question of producing a larger fruit of the Natal pine (weighing two pounds and over), to develop a large and important export of pines from this Colony. I am not enamoured with the prospects of exporting the large smooth-leaved Cayenne, but in the small Natal or Golden Queen there are opportunities which should not be neglected, for this variety stands unsurpassed for flavour.

MISCELLANEOUS FRUIT EXPORT.

The export of summer fruits is a matter which does not hold out much promise of a great future. The climatic conditions are such that good

carrying fruits can hardly be produced. If any development is to take place in this direction it is, I fear, only in connection with early plums and late apples. Given freedom from hailstorms, we have grand apple-growing districts, but hailstorms are hailstorms. In connection with this particular vagary of the elements, numerous enquiries have been set on foot, but little of value has been ascertained, and hail prevention seems, as ever, in the clouds.

Experiments are now in progress in connection with hail-guards for fruit trees, but at present it is difficult to say whether such can be obtained sufficiently inexpensive to justify their use.

In the export of avocados and mangoes there is promise of a small and remunerative export, but these lines require further exploitation.

I am glad to say that a small union has now been formed of mid-land orange growers interested in the continuance and development of orange export. The membership is at present small, but each member has agreed to export as many or more oranges than he shipped to Europe last season.

I would like to say that, in my opinion, a good deal could be done in Natal towards the development of an industry in first-class preserves and crystallised fruits, and encouragement of such industries would be perfectly justifiable, especially if inaugurated upon some co-operative basis.

LOCUSTS.

For the first summer during my term as Entomologist locusts have been a negligible quantity, no damage having been done by flyers or hoppers. Eggs were laid only in the Lower Illovo district and the resulting hoppers were all speedily destroyed.

It is thought by many that the locusts have disappeared in obedience to natural causes. Whilst I have always maintained that locusts will disappear from Natal for a time, as has happened in the past, to recur again at a later date in response to some natural law, there is no question but that our freedom from invasion this season and the comparatively small invasion of last season, is directly due to the effective hopper destruction which has been carried out in the north of us, i.e., the North-Eastern Transvaal, in Mozambique, and, more particularly, in Swaziland, during more recent years.

WATTLE INSECTS.

Wattle insects have been particularly troublesome this summer, especially leaf-eating beetles. More important, however, is the phase assumed by a trouble known among growers as "frog-hopper." Some time has recently been given to the study of this development, but, as the life-cycles of two distinct insects have to be more fully investigated, and because either of them may be the direct cause, I am not now able to

make any decided statement. I am, however, hopeful that in the case of young trees spraying will be found both effective and profitable.

MEALIE-TOP GRUB.

In view of the divergent opinions held with regard to the life cycle and development of the mealie-top grub, some further field observations upon this pest were carried out in the spring. These were confirmatory of previous investigations, and it may be interesting to say that pieces of stumps and stalks collected from newly-ploughed lands at Thorny Bush as late as the 23rd of November contained over-winter larvæ. These were, of course, exceptionally late, and at the time they were taken, pupæ were found and adult moths were on the wing.

MEALIE WEEVIL.

I am glad to say that tanking and carbon bisulphide treatment for the control of weevil attack are both being generally adopted. Speaking broadly, all mealies when harvested should be regarded by the farmer as infested and treated accordingly. Primary weevil infestation is a very small affair, and up to a certain stage it is practically impossible for the farmer to detect it. I mention this because of the important bearing the matter has upon export because of the weevil test to which grain is submitted. If the least trace of weevil condemns a shipment, it is, to my mind, very much a matter of luck whether a certain lot of mealies gets away or not. For instance, A sends 500 bags; they arrive with but little delay on rail, the ship is waiting to receive them, they are examined, passed, and shipped. B sends a similar quantity, but they arrive at the port three days later, are passed, but unfortunately a week elapses before they can be shipped. Before placing on board, they are re-tested, when weevils are found. Strictly speaking, the first lot is just as much weevil infested as is the second, and were it examined in the ship's hold would be found to be so.

It must, therefore, be obvious that some account should be taken of the degree of infestation, if any justification for the same can be urged, especially in view of the enormous quantities of grain refused shipment because of very slight infestation.

It should not be difficult to relax the weevil test from September to January, for the very simple reason that, whatever the degree of infestation when placed on board, as soon as the ship gets north of the Equator into cold water breeding is brought to a standstill, and the weevils are practically all dead when the grain is landed.

POTATO IMPORTS.

Our Port inspection of plant imports has increased very materially of late. This is not only upon account of increased imports, but because of the far greater attention given to potato imports.

The recognition by the Transvaal authorities of certain potato troubles as being particularly pestivorous, and the economic importance of two hitherto little known potato diseases has brought this about.

Although at first importers and their European friends maintained that it was impossible to ship out perfectly sound potatoes, I have no hesitation in saying that a marked improvement in quality has been the immediate result. Of course, apart from any question as to whether or not these potato troubles are likely to become established and pestilent in South Africa, there has been the fact that an embargo upon Natal-grown potatoes has long been threatened by our inland neighbours, and so every effort has been directed towards preventing any such contingency arising.

GOVERNMENT REPLIES.

The replies furnished by Government to the resolutions forwarded to them that were passed at last year's Conference were then considered.

Mr. Mitchell asked what would happen to resolutions which it might be desired to return to Government for further consideration. What Government were they to be returned to? Would it be the Union Government?

Mr. Hyslop recommended that the resolutions be left in the hands of the Executive Committee, who could decide where they should be sent.

Mr. King thought that resolutions affecting South African matters might be singled out to be sent to the Central Government.

The President said that this might be done with regard to most of the resolutions, but as regards East Coast Fever, resolutions on that subject should be sent to the Central Government as soon as the latter was organised.

The Government's replies to last year's resolutions were then read.
TRANSPORT.

The following resolution was passed by the Conference last year:—

“That owing to the stopping of ox transport throughout the Colony, it is absolutely necessary for the Government to make adequate provision to supply the needs of the country with transport.”

The following reply was received from Government:—The Government has recently increased the number of East Coast Fever transport wagons from 32 to 62, with a view to coping with the requirements of the various districts in the matter of transport. The Government is also importing mules to farmers at cost price.

Mr. C. H. Mitchell moved that the resolution be returned to Government.

This was agreed to.

RE-STOCKING FARMS.

Last year's resolution on this subject was as follows:—

"That this Union resolves to again approach the Government with the view of obtaining assistance for farmers who have lost their stock through East Coast Fever, each farmer so affected to receive one hundred sheep on the existing hire system."

The following was the reply furnished by Government:—"It is regretted that funds are not available for the purpose of supplying further sheep to farmers on the hire system."

It was decided to return the resolution to Government for further consideration.

FENCING.

The resolution passed at the last Conference on this subject was:—

"That it is the opinion of the Union that the Government should immediately fence all main roads in such districts where East Coast Fever exists."

To this the Government replied that no funds had been provided by Parliament for the purpose of fencing main roads.

It was resolved that the resolution be returned.

BLUE TONGUE VACCINE.

Mr. G. T. van Rooyen moved, and it was agreed, that the following resolution be sent back to Government:—

"That this Union sympathises with those who have lost sheep through vaccination for blue tongue, and would suggest that in the interest of the sheep industry a full inquiry should be instituted forthwith, as far reaching effects are likely to result."

On the 2nd August, 1909, the Government, replying to the resolution passed last year, stated that enquiry which had been made in this matter had satisfied the Minister of Agriculture that the vaccine which had been issued from the Government Laboratory at Allerton had proved entirely satisfactory except in a few cases, in which special circumstances had to be responsible for the deaths which had occurred.

GATES ON MAIN ROADS.

The following resolution was passed by the Conference last year:—

"That this Union is of opinion that farmers should, with the approval of the local Advisory Boards and Public Works Department, be allowed to erect gates across main roads, and that they should not be compelled to keep guards on such gates, as is the case at present."

The following reply was received from Government:—"The matter of authorising or requiring the erection of gates across any main or public road has been placed entirely in the hands of the East Coast Fever Advisory Committee by Act No. 32, 1909, and Section 4 of that Act provides

that it shall be the duty of the Committee by whose orders any gate has been placed across a public road to place an attendant in charge of the gate at all times.

It was resolved to return the resolution to Government.

MEALIES IN TEN-TON TRUCKS.

It was decided to return last year's resolution on this subject to the Government. The resolution read as follows:—

"That this Union requests Government to so alter the rule in force on the N.G.R. with regard to the conveyance of mealies for export oversea that the grain for this trade may be carried in ten ton consignments instead of in twenty ton consignments as at present, at the special export rate, in order that producers situated at a distance from the railway line may have an opportunity of selling mealies for export, and benefitting by the reduced rate."

FIREBREAKS AND WATTLE PLANTATIONS.

The following resolution and reply on the above subject stood on the agenda paper:—

"That in the opinion of this Union the time has come when legislation should be introduced to compel owners of wattle plantations which abut on boundaries to be kept free of all grass, scrub, or other inflammable material for a distance of at least ten yards from the boundary lines, this also to apply to plantations abutting on railway lines."

Reply, 2/9/09: "That is a matter which will be considered in connection with legislation."

It was decided to ask the Government whether the matter had actually been considered in connection with legislation, and to supply the Conference with details as to the result.

LANDLORD AND TENANT.

The same course was decided upon with regard to the following resolution:—

"In the opinion of this Union the time has arrived when, with respect to Native tenants living on occupied farms, the landlord wishing the tenant to leave or the tenant wishing to leave the farm of his landlord, should by a notice of six months on either side be enabled lawfully to cancel the agreement between landlord and tenant."

The reply, which had already been received from Government, was as follows:—"Provision for a uniform period of notice similar to that recommended in this resolution is contained in a Draft Bill to amend the law relating to contracts entered into by native tenants residing upon private lands, and the correspondence relating to the matter awaits consideration by the new Council for Native Affairs."

MOTOR TRACTION.

It was decided to return the following resolution to Government:—

"That in the opinion of this Union the Government should introduce a motor to be driven by alcohol that would draw a two or three-furrow plough or take a wagon with ten or twelve bags of mealies on the road, so that small farmers might purchase such when proved a success, thus encouraging a colonial industry and helping farmers who wish to have a plant at less cost than steam engines."

OTHER RESOLUTIONS.

Of the remainder of the resolutions which were passed at last year's Conference and forwarded to the Government, the following are the most important to which replies were received from Government and submitted to this year's Conference. The replies were passed over without discussion:—

BRANCH LINE RATES.—*Resolution*: "That this Union wishes to enter its protest against the present method of computing rates on the Natal Government Railways, and differentiating against the branch lines, whereby the inhabitants of outlying districts served by such branch lines are unfairly treated."—*Reply*. "The present system of compiling rates over branch lines was introduced on August 1st, 1907, as it was found that in the case of branch lines the traffic was so light that the receipts did not pay working expenses, apart from their share of interest and sinking fund liabilities."

S.A.P. RATES.—*Resolution*: "That in the opinion of this Union the N.G.R. rates on agricultural products and live stock, especially small consignments, are detrimental to the interests of the farming community."—*Reply*: "The reduction of the rates on agricultural produce, both in through and station to station traffic is at present under consideration with a view to a reduction of the existing charges."

RAILWAY RATES ON LUCERNE.—*Resolution*: "That in the interests of lucerne growers, and consumers generally, this Union recommends that the railway rate on lucerne from Weenen and Greytown be fixed irrespective of cost at sending station."—*Reply*: The special rates for lucerne from Weenen, Winterton, and Greytown were introduced for the sole purpose of enabling the Natal producers to compete in the Durban market with lucerne imported by sea, and as statistics show that the local production of lucerne in Natal for last year was approximately 700 tons as compared with approximately 140 tons imported from Cape Colony, it is clear that the competition is not of a very serious nature, and Government does not see sufficient reason for withdrawing the stipulation that lucerne conveyed at the reduced rate should be subject to a certain maximum selling price."

OBSTRUCTED BY-ROADS.—*Resolution*: “That in the opinion of this Union the owners of wattle plantations through which by-roads pass should be compelled to keep such roads free of growing trees, stumps and other obstacles dangerous to traffic.”—*Reply*: “It is considered that Section 22 of Law No. 35, 1901, sufficiently meets the case.”

GRUB IN MEALIES.—*Resolution*: “That this Union is of opinion that the serious consequences attending the spread of the mealie grub renders it necessary to take steps for its eradication, and therefore urges the Government to commence an investigation with this end in view.”—*Reply*: “The mealie grub has been very thoroughly investigated, and the most practical measures for its control have been pointed out repeatedly by the Government Entomologist. Later investigations conducted in Cape Colony have confirmed these measures as the most practicable and economic. Investigations in the natural economy of a somewhat similar pest in the United States also confirm these recommendations. The Government Entomologist is of opinion that no general good will be accomplished in the control until farmers can be persuaded to arrange for the removal of mealie stalks and stumps from the lands before the beginning of September.”

ENTOMOLOGIST'S WORK.—*Resolution*: “That the Government should make such arrangements in connection with fruit export as will ensure that the time of the Entomologist be devoted more to the investigation of diseases of mealies, wattles, potatoes, and other crops, than has been the case recently.”—*Reply*: “It is the object of the Government to at all times utilise the services of the Government Entomologist to the best advantage.”

EAST COAST FEVER.

The following resolution stood on the agenda paper in the name of the New Hanover Agricultural Association:—

“That this Union is of opinion that Government should withdraw all restrictions under East Coast Fever Acts and Regulations relative to the removal of cattle throughout the Colony, and respectfully urges Government to give effect to this resolution. In the event of this being impracticable, this Union is of opinion that the Advisory Board in each East Coast Fever Division be given full power (so far as the Board's own Division is concerned) to withdraw, at pleasure, all restrictions under East Coast Fever Acts and Regulations relative to the removal of cattle, and urges Government to give effect to this resolution.”

The President called upon Mr. Power, the Chief of the Veterinary Department, to address the Conference on East Coast Fever matters.

Mr. Power, in the course of his remarks, traced the course of the

disease. He said that the whole of Zululand was infected, and the same could be said of the Vryheid and Paulpietersburg Districts, as well as the Dundee District south of the Dundee-Vryheid line. Umsinga Division was also infected, including the Native location. There were no outbreaks in the Estcourt Division east of the main line of railway as far as the Department was aware. The Umvoti Division was pretty generally infected, and the same might be said of the Krantzkop Division. Victoria Division had been infected for some years. A certain portion was now considered clean, as no deaths had occurred for some two years past. The Umgeni, Camperdown, and Durban Divisions were all infected. A number of outbreaks had occurred in the Bergville District lately. There had been a couple of outbreaks recently in Winterton Settlement. In the Estcourt Division all south of Location No. 1 and to a great extent east of that location was practically clean. As regards Richmond District, the disease had spread very considerably during the past few months. The Camperdown District west of the line was also pretty generally infected. The disease had spread very rapidly lately in the Ixopo District; there were outbreaks all over the district. The Alexandra County was comparatively free.

In reply to a question, Mr. Power said that East Coast Fever was not abating at all. He also said that the percentage of recovery had in some exceptional cases been as high as 25 or 30 per cent., but this was quite exceptional.

Mr. Van Rooyen asked whether Mr. Power thought East Coast Fever had been stopped in its spread by fencing.

Mr. Power said that he did not think fencing had been a failure. Good fencing was the best means of checking the spread of the disease.

Mr. Van Rooyen also asked whether there were any cattle in the Colony which could be considered as naturally immune.

Mr. Power said there were such cattle. In reply to another question (by the President) as to whether he considered it possible to frame regulations to stop the spread of the disease, Mr. Power said he considered that the greater part of the Colony would become infected. New regulations were now being considered by the Government, but, of course, he could not say what would be decided upon. Replying to further questions, he said that farms might be considered clean fifteen months after the last death. Calves of salted cattle were just as liable to contract the disease as any other calves. The movement of cattle was responsible for the greatest number of fresh outbreaks; and in his opinion the action of the Government in stopping the movement of cattle had not been futile. Whilst, however, he considered that the movement of cattle had been the chief cause of the spread of the disease, it did not necessarily

follow that he considered it was the only cause. He believed in dipping, but he did not look upon it as a method of preventing the appearance of the disease in a herd, as if infected ticks were carried on to a farm by any means and attached themselves to cattle outbreaks of the disease were bound to occur. Where, however, dipping had been carried out thoroughly for some time before a farm became infected, the losses were considerably minimised owing to the reduction in the number of ticks, therefore all farmers should dip, as, even apart from East Coast Fever, it was necessary in a tick-infested country like Natal.

In reply to Mr. Smallie, he said that if there had been no restrictions on the movement of cattle the disease would have spread far more rapidly than it had done. In reply to another question, he said he saw no possibility of eradicating the disease unless fencing were continued.

In reply to a question by Mr. Mitchell as to what his future programme would be until the Central Government took control, Mr. Power said that he was not in a position to say definitely. He was, however, opposed to relaxation of the restrictions: their abandonment would cause a greater spread of disease and remove protection from those who had so far saved their cattle. The general position would not be improved; those districts which were, so to speak, swept by the disease three or four years ago were not yet clean.

In reply to Mr. Dick, he said that it was too late to try to eradicate the disease by general stamping out. Newcastle was one of the divisions where stamping out might be successfully carried out. He was still in favour of stamping out in certain cases. He also said, in reply to Mr. Bazley, that so far as he knew no methods of inoculation had yet proved effective or at present appeared to offer any hope of success. The Department was at the present time testing the Oosthuizen system of inoculation, but no very encouraging results had yet been obtained. They would be in a position to make a pronouncement, however, very soon. He said, in reply to another question, that there was no danger involved in the transportation of hay from a farm which had not had the disease for fifteen months. Another delegate asked approximately how many cattle had died from the disease. Mr. Power said that about half the cattle in the Colony had succumbed—half the number there were in 1906.

At this point a resolution was then passed urging the Government to inform the Union as early as possible who would act as Minister of Agriculture in Mr. Deane's absence.

Mr. Hancock moved a resolution to the effect that the Government be asked to inform the Union of the nature of the new regulations for the control of East Coast Fever which the Government were considering.

Upon the motion of the President, it was decided to ask the Government to supply that afternoon an advance copy of the regulations which had been drafted. The motion having been adopted,

A vote of thanks was unanimously passed to Mr. Power for his attendance and his explanation.

Further consideration of East Coast Fever matters was deferred pending the receipt of a copy of the new regulations which the Government proposed to put into force for the control of East Coast Fever.

LYMPHANGITIS COMPENSATION.

Mr. Mackenzie moved, on behalf of the New Hanover Agricultural Association:—

“That an Act should be passed providing for compensation being paid to owners of horses and mules slaughtered by Government on suspicion of lymphangitis, and that compensation should be paid whether the slaughtered animal is found to be suffering from lymphangitis or not.”

Mr. D. C. Dick seconded.

Mr. Power (Chief of the Veterinary Department) said that the Government was doing practically what was asked by the resolution.

In view of Mr. Power's explanation the resolution was withdrawn.

LAW COSTS AND PROCEDURE.

Mr. C. H. Mitchell, representing the Lower Umzimkulu Agricultural Association, moved:—

“The Union would call the attention of the Government to the present great difficulty and cost of obtaining access to the Law Courts of the Colony, and would urge, in the interests of justice, for far greater simplicity in the modes of procedure and substantial reductions in the fees charged and allowed.”

Mr. Hosking suggested that the Government be also asked to appoint Justices of the Peace in outlying districts to hear and decide upon cases.

The motion was carried.

RAILWAY MATTERS.

EQUAL CHARGES.

Mr. Mitchell moved, on behalf of the Lower Umzimkulu Agricultural Association:—

“That, in the opinion of this Union, the same charges should be made by the railway for conveying similar classes of goods over equal distances of line, whether the gauge be broad or narrow, and all charges for transhipment from one gauge to the other should be borne by the general railway revenue.”

The resolution was carried.

CARRIAGE ON SALT.

Mr. Woods moved, on behalf of the Mooi River Farmers' Association:—

"That, in the opinion of this Union, salt in quantities of not less than one ton should be conveyed on the N.G.R. at fertiliser rate."

Mr. Blaker seconded.

Mr. Oldacre suggested that full information should be obtained as to the railway carriage on salt.

Mr. King thought that the resolution should be withdrawn, in view of the large reductions which had been already made by the Railway Department.

The resolution was lost.

The delegates of the Dronk Vlei Association withdrew the following motions which stood on the agenda paper in the name of their Association:—

(a) "That, in the opinion of this Union, owing to the heavy charges imposed per rail on small consignments of Colonial produce, such as eggs and butter, business in this direction is discouraged when long distances are concerned, and suggests that the Railway Department be asked to provide a remedy."

(b) "That, in the opinion of this Union, the minimum charge on all small parcels by rail be reduced."

DEMURRAGE ON CATTLE TRUCKS.

Mr. Marwick, representing the Richmond Agricultural Society, moved:—

"That the Railway Department be approached with a view to obtaining redress with reference to the charges made for demurrage on cattle trucks, and the inconvenience and loss caused by the Department not supplying the necessary trucks at the stipulated time."

Mr. Blaker asked why the farmer should have to pay for trucks when at the port there were miles of coal trucks waiting to be emptied and on which no demurrage was paid. The coal-owners were thus allowed to store their coal in Government trucks instead of building sheds for the purpose.

Mr. Fleming referred to the want of kraals for cattle waiting at stations to be trucked. Often cattle could scatter all over the neighbouring veld and so spread disease.

Mr. King pointed out that local management had a lot to do with the matter of supplying trucks. He agreed that there was a shortage of trucks on the railway, but at the same time he blamed the railway management for not making earlier provision.

Mr. Wiltshire referred to the bearing of the coal industry on the

subject. He said that the concession to the coal-owners was a very necessary one, on account both of the importance of the industry to the country and of the friable nature of the coal owing to which the value of the coal was liable to deteriorate by too frequent handling. He thought the colliery owners were only too willing to adapt themselves to the requirements of the country. He referred at length to the value of the coal industry to the Colony.

Mr. Mitchell asked what the amount of demurrage charged was.

Mr. Marwick said that the charge was 8s. per truck.

The motion, on being put to the vote, was carried by 18 votes to 17.

RATES ON WATTLE BARK.

The delegate for Seven Oaks Farmers' Association moved:—

"In the opinion of this Union the railway rates on wattle bark, particularly stick bark, are too high, and should be reduced by the railway authorities."

The mover thought bag bark should have preference over stick bark.

The Secretary announced that reductions had been made in the rates of bark, and in view of this fact the mover decided to withdraw the resolution.

CASH PAYMENTS.

Mr. Blaker moved, on behalf of the Mooi River Farmers' Association:—

"That this Union is of opinion that the Railway Department should withdraw the regulations whereby payment in cash for each consignment of goods before it leaves the shed is enforced, and recommends that a certain amount of discretion in collecting of such charges be left with stationmasters."

The resolution was lost.

AGRICULTURAL SOCIETY GRANTS.

The following resolution stood on the agenda paper in the name of the Unvoti Agricultural Society:—

"That, in the opinion of this Union, the Union Government should be asked to continue the support to Agricultural Societies as liberally as in the past."

Mr. Mitchell said that he understood from the Under Secretary for Agriculture that the question of making grants to the Agricultural Societies this year was being considered by Government. The amounts would be the same as those granted the last year in which grants were given.

Mr. I. M. van Rooyen said that they nevertheless had no guarantee that grants would be given annually by the Union Government. Speaking

to the above motion, he said that the Agricultural Society was one of the best advertisements that the Colony could have.

Mr. Woods said he would vote against the resolution. They could make no suitable show without cattle, and he thought the money would be badly expended.

Mr. Van Rooyen said he was surprised that such an experienced farmer as Mr. Woods should make such a statement. Mr. Woods was a great breeder of sheep and horses and other classes of stock, and surely these were worth showing? Why should they be inclined to abandon their shows because they could not exhibit cattle?

After some discussion the motion was withdrawn.

JACKALS IN GAME RESERVES.

Mr. Blaker moved, on behalf of the Mooi River Farmers' Association:—

"That, in the opinion of this Union, the Government should be approached to permit of jackal hunting in game reserves."

He said that they found that the jackals had increased to such an extent that they were not able to do much to keep these animals under, and their efforts were to a great extent nullified by the appearance of jackals from the game reserve. If they had permission to hunt these jackals in the game reserve it would do much to lessen the pest.

Mr. Green said he knew for a fact that the Government would place no obstacle in the way of any who might desire to hunt in the game reserve.

Another delegate said they wanted a free hand to go into the game reserve to hunt whenever they liked without having to get a special license.

The resolution was withdrawn.

OBNOXIOUS WEEDS.

Mr. Blaker moved, on behalf of the Mooi River Farmers' Association:—

"This Association views with alarm the enormous spread of obnoxious weeds in this district, on town lands, public roads, and private roads, and urges the Government to be most stringent in their effort to eradicate same, the Scotch thistle especially."

He said it was a difficult matter to keep their farms clean when the Government roads were infested

Mr. King suggested that it would be better to ask the Government to reinforce the Noxious Weeds Act.

Mr. Sykes said that down on the coast the Government had put that Act into force.

On the motion of Mr. Mitchell, it was agreed to replace the resolu-

tion by the next resolution on the agenda—to be introduced by the Dronk Vlei Farmers' Association—as follows:—

“That this Union is of opinion that the attention of the Government should be drawn to the rapid spread of burr weed—*Xanthium spinosum* and *X. strumarium*—with a view to its eradication on roads, reserves, and other Government lands.”

Mr. King moved the following amendment:—

“That the Government be requested to re-inforce the Noxious Weeds Act, always provided that the Government undertake to keep the public roads, railways and public lands clean of these weeds.”

This amendment was carried.

THE SPARROW PEST.

Mr. H. E. Mingay moved, in the absence of any delegate representing the Camperdown Division Farmers' Association (in whose name the motion stood):—

“That this Union asks the Government to take immediate steps to eradicate the flocks of sparrows flying about Durban streets before they become a pest to farmers and others in the Colony, as they have become in other Colonies.”

Mr. Wood said the sparrow was not a harmful bird from the point of view of the farmer. At any rate, they would not be able to exterminate this pest. There were other birds in Natal which did much more harm.

Mr. Marriott said he was afraid Mr. Wood had forgotten the amount of damage which the sparrow did in England. These birds did tremendous damage to crops. They also drove all insectivorous birds right and left. He thought they would be a terrible pest to this Colony, such as it was already in Australia and the United States.

Mr. Sykes said the Durban Corporation were paying 3d. for every sparrow brought to them, and he thought this action would go a long way towards eradicating the pest.

It was moved that the resolution stand down until the next day.

RUST-PROOF WHEAT.

Mr. Marriott moved on behalf of the Dronk Vlei Farmers' Association:—

“That this Union is of opinion that the importance of wheat production in this Colony is such that the Director of the Cedara Experimental Farm should be instructed to renew his efforts to discover a rust resisting wheat that may be cultivated without irrigation in Natal, and suggest that the Director should send samples of seed wheat to various Associations to test which is the best rust-proof wheat, with a view to ascertaining the best varieties for each district.”

The resolution was carried unanimously.

LABOUR MATTERS.

Mr. Bernard Greene, representing the Nottingham Road Farmers' Association, moved:—

"That this meeting, representing the farmers and planters of the Colony, desires to impress upon the Government the very urgent need for the immediate organisation of the labour supply of the Colony ere indentured Indian labour is finally withdrawn, and the Colony's agricultural and other resources largely crippled."

Mr. King seconded.

Mr. Woods thought it would be a very good idea to indenture the "skibengas" that were giving trouble in the towns—this to take the place of punishment by imprisonment.

Col. Addison, speaking as a member of the recent Indian Labour Commission, thought an attempt should be made to make use of the Native boys who had drifted permanently to the towns, deserting their parents and contributing nothing to their upkeep. These boys might be indentured. He thought it should be made compulsory. Indentures might be for a term of three years: after which the best of them might be re-indentured to higher work than ordinary field work.

Mr. Marriott, in supporting the motion, suggested that part of the wages be handed over to the parents of the boys and part to the boys. He thought that a system of indenturing was really necessary in the interest of the Natives themselves.

Mr. I. M. van Rooyen said he did not think that anything effective could be done in regard to the Native labour question until they had uniform laws throughout the Union.

The resolution, upon being put to the vote, was carried unanimously.

DESTRUCTION OF SPARROWS.

Reverting, on the second day of the Conference, to the motion *re* extermination of sparrows, which stood down the previous day on account of the absence of the representative of the Camperdown Farmers' Association,

Mr. J. Moen said the time had come when the systematic destruction of sparrows must be taken in hand, ere they became an uncontrollable pest. He dwelt upon the large amount of damage which was done by these birds in America and England.

Mr. Gray said the sparrow was now all over the Colony, and he understood that it had also made its appearance in the Free State.

Mr. Hancock said he did not think that the bird Mr. Gray had in mind was quite the same species as the English sparrow: but at the same time he would support the resolution as he recognised the danger to the

Colony in allowing the English sparrow, which was already in the country, to spread.

Mr. Marwick moved the following amendment:—

"That this Union request that the Government take immediate steps to eradicate the flocks of English sparrows flying about before they become a pest to the farmers and others in South Africa."

Mr. Moon agreed to the substitution of this amendment for his original resolution.

The resolution was carried unanimously.

ABSENCE OF GOVERNMENT OFFICIALS.

Attention was drawn by one of the delegates to the absence of officials of the Agricultural Department, who had been invited to attend. A discussion took place on the matter, and the following resolution was passed:—

"That Heads of the Agricultural Department be sent for when they are required to be present for special resolutions."

MANUFACTURE OF AGRICULTURAL REQUIREMENTS.

Mr. D. C. Dick, representing the Royal Agricultural Society, moved:—

"That the Government be requested to take into consideration the advisability of encouraging the manufacture of agricultural requirements, including fertilisers and machinery, within the Colony by subsidy."

He considered that the manufacture of agricultural implements required in Natal might easily be undertaken here. Manufacturers, however, were not able to compete with the oversea producer, and he consequently thought that a system of subsidies should be instituted.

Mr. King considered that the proper method of encouraging manufacturers was that of protection, and not by bonuses or subsidies. Protection, however, was of no use unless it was adequate. He said that the tendency in imported machinery was to become worse and worse, especially in American machinery.

Col. Addison also thought that the encouragement of the local manufacture of implements should take the form of protection rather than subsidies.

Mr. Hancock pointed out that the establishment of a local manufacture of implements might tend to raise the cost of the farmer's working plant, which would mean the lessening of the margin of profit on production.

Mr. Wood adopted the same line of argument. A heavy protective duty would be necessary, which would considerably enhance the price of implements to the consumer.

Col. Leuchars said the difficulty could easily be got over by the establishment of subsidies. This would give a chance to manufacturers to establish an implement industry, and they would then probably in time be able to do without both subsidy and protection.

The resolution was carried.

REPAIRS TO ROADS.

The delegate of the Weenen Agricultural Society moved:—

“That this Conference is of opinion that the roads of the Colony require better attention by way of repairs, and that the Government be requested to provide further road parties for that purpose.”

He said that during the period of retrenchment most of the road-parties had been taken off, but it was time they were replaced.

Another delegate blamed the road superintendents in many cases for the present state of the roads of the Colony.

Mr. King moved the addition of the words, “and where possible both construction and repair be done by contract.”

Mr. Kirkman moved the substitution of the following words for those after “by way of repairs,” viz.: “and that the Union urge that a permanent hardening of the drifts and roads is most desirable.”

Mr. Barnes, Chief Engineer, P.W.D., then addressed the Conference by request. *Inter alia* he agreed with the suggestion that it was most desirable to harden the drifts. Also he dwelt upon the need for improving the grade of roads, but he said that the total vote for roads this year had only been £7,000, which was not sufficient. He disagreed with the suggestion that the road superintendents were at fault. He said that a lot would have been done by the end of the present season in the way of repairing roads. He gave his assurance that he would do his best to foster the contract system, within limits. He said that it would be a great help to his Department if farmers' associations would draw his attention to any road improvements which might be desirable.

The mover of the original resolution withdrew his motion in favour of Mr. Kirkman's amendment.

The motion as amended was carried.

TYRES OF VEHICLES.

Mr. Dick moved on behalf of the Royal Agricultural Society:—

“That in the opinion of this Conference the width of tyres on the wheels of vehicles used for transport within the Colony should be regulated as follows: For vehicles carrying two tons or less a minimum width of $2\frac{1}{2}$ inches, and for every ton in excess of that weight $\frac{1}{2}$ inch additional in width. This to come into effect after a date to be specified by Government, and builders to be instructed accordingly. That Government should be requested to take immediate steps to give effect to the foregoing.”

Mr. Dick said he would like to ask Mr. Barnes for his opinion as to the minimum widths of tyre which should be adopted for various tonnages.

Mr. Barnes thought the measurements given in the motion would answer all requirements. These tyres would have the effect of a roller rather than cut up the roads.

Continuing, Mr. Dick said they had asked Government at various times to do a great deal for them, and it was time they offered to do something in return, and this they could do by passing the present resolution, the suggestions contained in which would, if adopted by the Government, prove of some assistance to the Government by lessening the cost of the upkeep of roads. The suggested regulations would only be enforced in the case of heavy loads of produce. He had consulted the wagon makers of the city, and he had found that the enforcement of such regulations would not prove a hardship to them, as had been suggested.

Mr. Bazley considered that the adoption of wider tyres would have the effect of tearing up the roads even more than the tyres at present in use, be reason of the fact that skidding in wet weather would be rendered easier.

Rev. Jas. Scott also spoke against the resolution.

Mr. Hancock was in favour of the increasing of the width of tyres.

Mr. Wood considered that the best method of dealing with the matter would be to adopt the old English system of putting a tax on all wheels whose tyres were under certain dimensions.

Mr. Lund thought the idea of the resolution was valueless. In wet weather they could easily put a smaller load on their wagons than they did in ordinary weather.

The resolution was lost.

GRANT TO THE UNION.

Mr. Hosking, representing the Royal Agricultural Society, moved:—

“That in the opinion of this Union the time has now arrived when Government should be asked for an annual grant of £1,000 to the Natal Agricultural Union.”

He said such a grant would enable the Union to subsidise industries and become of more benefit to the Colony generally. He did not ask for the money as a grant towards the defrayal of the ordinary expenses of the Union.

Mr. Mitchell said that the Transvaal Agricultural Union had for many years been in receipt of £1,000 a year from the Government towards the funds of the Union. He pointed out, however, that at the present time the Natal Union was an independent body, and that, if

they were in receipt of a Government grant, their hands would be somewhat tied.

The Rev. Mr. Scott also thought that the securing of a grant from Government would destroy their independence as a Union (dissent). He said he had not yet made up his mind which way to vote, but the financial position had to be faced. If funds were not obtained from Government they must be obtained elsewhere.

Mr. King suggested that the Government should grant free passes for delegates travelling to the Conference, rather than give a lump sum of money.

Mr. Marwick supported Mr. King's view. He did not like the idea of approaching Government for the money necessary to run their Union. He thought they should endeavour to find some other means of raising the money.

Mr. Kirkman considered they should endeavour to enter Union on the old lines upon which they have always run. Under Union, if the Transvaal Agricultural Union received a grant they could be quite certain that Natal would benefit to the same extent.

Mr. Moon said it was just a temporary depression which the Agricultural Union had entered into. He counselled endeavouring to do without Government assistance. They must find a way to get out of their difficulties, without going to the Government.

The President explained the causes which had brought about their present temporary financial difficulties. They had been abnormal causes.

The Secretary, in reply to a question, outlined the financial position of the Union.

One delegate suggested that the Government be approached for funds on the £ for £ principle.

Col. Leuchars thought that, in view of the fact that the Government grants were to be resumed this year, societies might be asked to assist the Union from the funds thus provided. He moved an amendment to this effect, fixing the proportion at 10 per cent.

Mr. Bernard Greene proposed that the rates of subscription of affiliated associations be doubled.

On the motion of Mr. Hesking, the debate was adjourned until the following day, in order that delegates might have time to consider the whole subject.

ELECTION OF OFFICE-BEARERS.

The election of office-bearers was proceeded with on the afternoon of the second day. The following were appointed:—

President, Mr. E. W. Evans (re-elected); *Vice-President*, Mr. I. M.

van Rooyen; *Secretary*, Mr. D. M. Eadie (re-elected). *Executive*: Northern District—Messrs. J. G. Bester, Wiltshire, Oldacre, Smallie, and Von Levetzow. Midlands—Messrs. J. Marwick, O. Hosking, J. King, J. Moon, and Rev. J. Scott. Durban and Coast—Messrs. C. H. Mitchell, H. Bazley, J. Burman, W. Sykes, and J. Kirkman.

The following delegates were appointed to represent Natal at the next Conference of the Inter-Colonial Agricultural Union (to be held at Capetown):—Messrs. C. H. Mitchell, J. Marwick, O. Hosking, H. Bazley, W. Comrie, W. J. S. Newmarch, Jas. King, I. M. van Rooyen, G. C. Mackenzie, A. von Levetzow, John Moon, J. G. Bester, H. Wiltshire, Col. Leuchars, and Rev. Jas. Scott.

TREE PLANTING COMPETITIONS.

Mr. O. Hosking moved on behalf of the Royal Agricultural Society:

"Seeing that the Committee appointed to carry out the tree-planting competition have secured enough money to continue this scheme for five years, it is the unanimous opinion of this Union that a fruit-tree planting competition should be started on the same lines, using the interest from the investment of the tree-planting competition fund, to offer similar prizes for the fruit-tree competition. Trees to be planted before September, 1911, and to be judged in December, 1915."

Col. Leuchars seconded, and the resolution was carried unanimously.

SPURIOUS SEEDS.

Mr. King moved on behalf of the Nottingham Road Farmers' Association:—

"That in the opinion of this Union the time has arrived when a general Act should be passed, embracing the whole of South Africa, securing farmers against the vending of spurious or diseased seeds and plants, or deficient fertilisers, and attaching full responsibility to the vendors on any proved failure of quality or description."

Mr. Greene seconded; and after a short discussion the resolution was carried.

EXPIRY OF IDENTIFICATION PASSES.

Mr. Marriott, representing the Dronk Vlei Farmers' Association, moved:—

"That Magistrates, in the opinion of the Union, should be instructed to state on the identification pass, according to permission granted by landlords, the date of expiry, and also on all outward passes if for less than twelve months."

Mr. Von Levetzow said there was a law to provide for this, but it was not effective.

Mr. King pointed out that the fault did not necessarily lie in the

law itself but rather in the regulations framed under that law. The regulations might be altered so as to give the required relief.

The motion was passed.

EAST COAST FEVER (*Continued*).

At this point the President announced that a reply had been received from the Government regarding the report of the East Coast Fever Advisory Commission appointed under Section 5 of Act 20, 1910. The report was read by the Secretary, and ran as follows:—

The Commission sat on the 3rd and 4th insts., and, after discussion with the Minister of Agriculture, the Chief of the Veterinary Division, and the Secretary for Native Affairs, came to the conclusions embodied hereunder.

It was felt that under the circumstances of the Parliamentary vote of £100,000 and the imminence of Union, the most important step to be taken, would be to check the spread of East Coast Fever to new districts.

It was accordingly resolved, and the resolution forwarded to the Minister of Agriculture:—

“That the Government be strongly urged to at once concentrate all efforts west of the line towards fencing with all speed all known outbreaks of East Coast Fever, then branding all cattle therein, with a view to their subsequent slaughter, compensating owners thereof, under Act No. 8 of 1907.

“The Commission further recommends that application be made to the adjoining Colonies to contribute towards the expense involved, including that of compensation.”

The Commission recommends that such isolated outbreaks as occur on the east of the line should also be treated in the same manner.

The Commission recommends that all unfenced railway lines in the Colony should be fenced.

It is felt that if the above recommendations are adopted by the Government, and actively carried out, the further spread of the disease can be checked, and the task of eradication under Union much shortened and simplified.

The Commission cordially approves of Act No. 20 of 1910, with the exception of Clause 4, regarding which an alternative suggestion is hereinafter made, and believes that the assistance thus rendered to farmers will be of the greatest service.

If, however, there is to be any hope of really controlling East Coast Fever, it is absolutely necessary to prevent the illicit movement of cattle.

The movement is chiefly carried out by Natives, and is the main cause of the spread of the disease.

Accordingly the following resolution was passed, and forwarded to the Minister of Agriculture, with the one already mentioned:—

“Resolved that the amount of £10,000 voted to the Natal Native Trust for East Coast Fever purposes be used exclusively and immediately on fencing and subdividing Native locations. Should this not be conceded, the Commission hopes that no other steps will be taken pending the presentation of its report in about two weeks’ time.”

The Commission deprecates the expenditure of any funds on other methods, until such fences are completed, when the other recommendations (branding and cleaning) hereinafter made should, in the opinion of the Commission, be made compulsory and universal.

The extent of the sub-division of locations referred to in the resolution would, of course, depend on the area, population, contour, water supply, etc.

It is further recommended that all fences around isolated outbreaks should be guarded or patrolled until such can be effectively dealt with, and, in addition that the Natal Police, or other body, should be called out to thoroughly guard all unfenced outbreaks until such time as the fencing in thereof can be effected.

The Commission is of opinion, in the event of the recommendations in regard to the fencing being carried out, that, together with the assistance to be rendered to farmers under Act 20 of 1910, as much as possible will have been done in the direction of combating the disease by means of fencing.

The Commission, feeling strongly that illicit movement is the greatest source of danger, and must be stopped at any cost, urges the Government to initiate legislation for the compulsory branding of all cattle in the Colony, on the lines laid down in the Transvaal Branding Law of 1904.

This law, if backed up by severe penalties for contravention and illicit movement of stock, would certainly check the spread of the disease, besides being a great service in preventing stock thefts.

It may be urged that the Natives will object to branding, but experience proves that illicit movement cannot be stopped in any other way, and the exigencies of the case demand its prevention.

The Secretary for Native Affairs, in giving evidence before the Commission, said that he realised the necessity of branding, and that, though the Natives would look upon it with suspicion, he did not anticipate any serious difficulty, provided the matter was left to him to explain to them.

The cleansing (by dipping, spraying, or hand-dressing) of cattle is finding greater favour daily, but it is still untried by a considerable portion of the white farmers and by almost all Natives in the Colony.

Its importance is so obvious, and the drawbacks so few, that the Commission is of opinion that its adoption should be made compulsory.

This will be no hardship when it is considered that a dip can be erected for £50, or a spray pump purchased for 20s.

The regulations contained in the *Gazette*, and adopted on the 12th May, 1908, by the Richmond Infected Area Advisory Board should be withdrawn, and the Commission recommends that the regulations embodying the following suggestions should be applied to the whole Colony:

(1) It is required that all cattle in the Colony be kept reasonably free from ticks.

(2) Stock Inspectors shall be required to inspect all herds in their districts as is done under the Scab Act, further assistance being rendered by other Government officials, duly authorised, such herds to be visited as often as the Department deems necessary.

(3) In the event of any herd being declared by the Inspector to be infected, the owner or person in charge of such herd shall be granted a licence for thirty days, during which no cattle be removed.

(4) At the expiration of this time, the Inspector shall again visit the herd, and if the cattle should be still infected, a penalty of £1 shall be imposed, succeeding breaches of the regulations at similar periods being subject to an increasing penalty of £1 for each licence.

(5) Penalty for obstruction, see Clauses 2 and 16 of the Scab Act.

(6) It shall be the duty of Inspectors to instruct Natives in locations and on farms unoccupied by Europeans, in the use of cleansing agents.

* The suggested regulations provide the alternative to clause 4, referred to on page 2 of this report.

In this regard, the Commission is of opinion that, in the interim until the above regulations are adopted, Stock Inspectors and other officials appointed, should be instructed to refuse permits to remove cattle for any purpose whatever, unless they are satisfied that the whole of the applicant's cattle are reasonably free from ticks.

If the above recommendations pertaining to fencing, branding, and dipping or cleansing are carried out, and all persons, including Natives, treated alike, the Commission believes that it is not too late to control the disease.

There remain some comparatively minor matters to refer to.

Movement of slaughter cattle from infected veld.—The Commission advises that movement of cattle from infected veld should be allowed

over infected areas only, and in no case over veld which is clean or in process of cleansing.

Destruction of stray cattle and illicitly moved.—The Commission is of opinion that action in this regard be left to the discretion of the Department, it being believed that black and white will be treated alike.

It is recommended, however, that where it is found necessary to give Natives short notice to sell any of their cattle which may have strayed, the Government should take them over at schedule rates to save owners being victimised by unscrupulous buyers as has happened in the past.

Sub-division of farms by the main line of railway.—The policy of considering the main line of railway as a boundary across which cattle are not allowed to pass should, in the opinion of the Commission, be continued and extended to the Cape-Natal and Stuartstown branch lines.

One dipping tank for two farms.—The Commission is of opinion that this should be allowed where fencing is to be erected as to preclude any chance of cattle mixing.

Provision for trucks.—The Commission considers that kraals should be erected by the Railway Department at all stations where cattle are entrucked as delay and dangers often occur owing to trucks not being available.

Movement of meat.—Great risk of spread of East Coast Fever is caused by the practice of the Natives removing meat from animals which have died from East Coast Fever, to which portions of hide adhere.

The punishment meted out to offenders brought before the Magistrate appearing to be inadequate to check the offence, it is suggested that the Attorney-General be asked to bring the seriousness of this offence to the notice of the Magistrates.

Movement of "salted" cattle.—Owing to the difficulty of ascertaining the immunity of such stock, and the consequent danger of re-infection, the Commission cannot advise that this should be allowed at present.

Calves from immune parents.—A considerable number of farms are now clear of the disease, with perhaps a few head of cattle remaining. All calves born from this immune stock will be susceptible to the disease, and so re-infect the veld; some method of dealing with the problem should be adopted, otherwise there will be danger of East Coast Fever becoming endemic as is the case in German East Africa.

The whole question is a most difficult one, especially in the case of Natives, and yet is one which must be fully and firmly dealt with.

Your Commission is not yet, however, prepared with a recommendation, but will consider the matter further at an early meeting.

The Government is advised to consider the question of purchasing and removing a quantity of breeding cattle to comparatively safe areas,

such as game preserves, with a view to re-stocking depleted portions of the Colony.

Mr. Otto's treatment.—A resolution was sent to the Minister of Agriculture on the 4th inst., and the Commission hopes that an agreement may be arrived at whereby the treatment may be fairly treated by the Government.

REMOVAL OF RESTRICTIONS.

Rev. Mr. Scott, representing the New Hanover Agricultural Association, moved:—

"That this Union is of opinion that Government should withdraw all restrictions under East Coast Fever Acts and Regulations relative to the removal of cattle throughout the Colony, and respectfully urges Government to give effect to this resolution. In the event of this being impracticable, this Union is of opinion that the Advisory Board in each East Coast Fever Division be given full power (so far as the Board's own Division is concerned) to withdraw, at pleasure, all restrictions under East Coast Fever Acts and Regulations relative to the removal of cattle, and urges Government to give effect to this resolution."

In moving, Mr. Scott hoped those who were opposed to the idea of this resolution would credit its supporters with as much public spirit as they themselves had. (Hear, hear.) What were the facts? Three or four years ago they were asked to draw fences here and there. Not in one case were those fences drawn, but in a few cases they found the disease on the other side of the fence. (Hear, hear.) The disease travelled very rapidly. The tick moved in a thousand ways that they had not believed it could do before. It was carried by cattle, mules, donkeys, game, birds; and he was positive that it was carried on the grass that was blown for miles by the winds. (Hear, hear.) If that was so, what was the use of going on with the regulations now in force. Thousands of pounds had been spent, but to no effect, as the disease was spreading from farm to farm and from district to district. Was it not time for them to reconsider the position? He was one of the strongest in favour of stopping the movement of cattle, but he knew a great deal more about the disease than he did about two years ago. *Re* immune cattle, he said that his own observation went to show that 10 per cent. was the average of recoveries. (Hear, hear.) Let them try something new.

Mr. Mitchell moved the following amendment:—

"This Union heartily endorses the suggestions made by the Advisory Commission, and urges the Government to carry out the same."

He said that the Commission had been appointed by the Government, and their own President had been made chairman. They had

taken evidence from all possible sources. He outlined the suggestions made by the Commission; and he pointed out that the Commission had expressed themselves strongly averse to any such proposition as that made by the Rev. Mr. Scott. It was all very well for men like Mr. Scott, who had lost nearly all their cattle, to throw up the sponge. He said that what the Prime Minister had said with regard to dipping was quite true—dipping was one of the best weapons they had for fighting the disease. (Hear, hear.)

Mr. Moon strongly supported Mr. Scott, who was an old colonist and knew what he was talking about. The removal of restrictions should be left to the Advisory Boards.

Mr. Scott asked leave to withdraw the first part of his resolution. (Applause.)

Mr. Newmarch said that there was probably not a better fenced county in the Colony than Umvoti County, and yet they had the disease in their county. He said that under the present circumstances the disease was being kept alive. What they wanted was clean areas.

Mr. L'Estrange said that it was quite evident that the Government had failed—they had practically admitted at the E.C.F. meeting in Maritzburg two and a half years ago. If that was true then it was even more true now; and he thought it was high time that the control of the disease be handed over to the farmers. (Hear, hear.) He was heartily in favour of leaving the question of movement of cattle to the Advisory Boards, who, as representative of the farmers, were in the best position to know what should be done.

Col. Rethman also expressed his strong approval of what Mr. Scott had said.

Mr. Bazley was strongly of the opinion that the regulation of the movement of cattle should be left in the hands of the Advisory Boards. He was against the fencing of large areas; let the Advisory Boards fence each outbreak at once, as soon as it appeared.

Mr. Blaker thought it was their duty not merely to consider the infected districts, but they should look also to the clean areas. It was the clean areas that they had to depend upon from which to stock the country in the future. He was very much astonished that such a request as that which they had now to consider should ever have come before that Union. As soon as they began outspanning on the roads they were going to bring back the disease to areas which it had practically left. He thought however, that those who had lost their cattle should be given some help, but at the same time he thought that anyone who should be found moving cattle outside of any particular zone should be severely punished. He asked how the Kafirs were going to be dealt with in the

locations? Had it not been for the fences the disease would long ago have swept through the country. Let them fight the disease to the last beast.

Mr. Fleming said he was amazed that the farmers of this Colony should be so shortsighted as to bring forward such a suggestion as that now before the Conference. It had been said that fences had been of no use. ("No!") He could not understand that attitude. Fencing had been found of great value in the Transvaal. He thought that dipping and fencing should go hand in hand. He was also very strongly in favour of branding, which was necessary to prevent the illicit movement of cattle.

Mr. Bester said that Mr. Scott had asked what were the facts. What really were the facts? They amounted to this: that if the restrictions were relaxed they would very soon not have a single animal left in the country. The only thing that appealed to him was dipping and fencing. In the Transvaal they had successfully fought East Coast Fever, and they were going to do it in Natal. It was of no use throwing up the sponge now.

Mr. Van Rooven thought that the control of the movement of cattle should be left entirely in the hands of the local farmers.

Mr. Mitchell withdrew his amendment in order that consideration of Mr. Scott's motion might not be rendered difficult or confusing. He was certainly not in favour of Mr. Scott's suggestion—he was strongly against it—but he would withdraw his amendment in order that delegates might vote either for or against Mr. Scott's resolution, without any side-issues.

Mr. Hanceck said that there was in the resolution brought forward by Mr. Scott a good deal for them to consider. It was not quite clear as to the extent or scope of this resolution, but the outstanding feature was this, whether at the present time the regulations should be in any way relaxed. He held that those regulations, instead of being relaxed, should be made more stringent. Mr. Scott had shown them that East Coast Fever was liable to be carried about as long as the disease exists. The only thing to be done, to his mind, was in isolated places to stamp it out altogether. At a meeting recently in the Transvaal there was a vote of thanks passed to the Transvaal Government for the efforts made to deal with East Coast Fever. Those regulations were very stringent. In the Cape Colony, again, the regulations which had been formed to deal with the disease were very stringent, and prompt action was being taken upon the appearance of the disease. He suggested stamping out, starting at the outskirts, and pressing the disease back by degrees. They had to deal with this question in the broadest possible spirit, and consider what was best for the whole Colony and not what was best for one or two districts.

only. This was not the time to think of any relaxation of the regulations: if anything, they should be made more stringent. If Mr. Scott's suggestion was carried into effect, they would have the disease with them ten years hence just as much as they had it now. (Hear, hear.) The regulations framed by the Advisory Commission ought to be adopted: were they adopted they would see the beginning of a new era. (Hear, hear.)

One delegate said that the Native was responsible to a great extent for the spread of the disease, carrying as he did ticks on his great coat as he travelled from district to district. He knew of one occasion when 200 ticks had been found on the great coat of a Native by a farmer. This being so, he argued, what was the use of restricting the movement of cattle? He also asked of what use were restrictions in districts through which the disease had passed?

Mr. Smallie, who represented the Hattingh Spruit Association, had received instructions to strongly oppose the present and the two following resolutions. He thought it was an extraordinary thing that, after fighting this disease as they had done, they should find gentlemen in this Colony willing to nullify the labours of the last three and a half years. The policy of the stoppage of movement of stock had been a good one, in spite of all that had been said to the contrary. There had been much adverse criticism of the Veterinary Department, but he held that the Department had been in a very peculiar position. They had not only had to fight a strange and unknown disease, but they had had to fight against antagonism on the part of the farming community. Had the farmers of the Colony done more to support the Veterinary Department the Colony would have been in a much better position at the present day. He said that the fundamental principles for the control of East Coast Fever advocated in the past by the Veterinary Department stood to-day just as well as they ever did. He did not blame the Veterinary Department but the Government for the slackness which had been apparent in adopting measures embodying their principles. Political considerations had been allowed by the Government to weigh too strongly. As regards the suggestion that the control of the movement of cattle be placed in the hands of the Advisory Boards, he considered that it was wrong and unfair to place such responsibility upon the Boards. He felt that undue influence would often be brought to bear upon members of these Boards with a view to securing desired concessions.

Mr. A. von Levetzow said that the members who had opposed the motion before the meeting had given no real reasons why they should vote against it. It was quite a reasonable proposition to leave the Advisory Boards to permit the movement of cattle where desirable—not necessarily all over the Colony, but only where local circumstances

warranted such a course. He moved the following amendment:—

“That this Union is of opinion that Government should withdraw all restrictions under East Coast Fever Acts and Regulations relative to the removal of cattle throughout the Colony, and respectfully urges that the Advisory Board in each East Coast Fever division be given full power to control all restrictions on the movement of cattle, and that steps be taken to give effect to this resolution.”

By leave of the meeting, Mr. Scott withdrew his resolution in favour of this amendment.

Mr. Marwick said he did not mind what regulations were enforced, or how stringent they might be, but he certainly considered that such regulations should be made effective in the case of white and black alike. He agreed with Mr. Smallie in his contention that the Government had not acted upon the advice of the Veterinary Department.

Mr. King said that, in spite of all the defence of the Veterinary Department which had been offered, there had been no constructive criticism. Nothing in the way of fresh suggestions for dealing with the disease had been offered; and, after all, all that remained to them was the resolution now before them. He spoke very strongly on the lax method of guarding the main line. He said that there had been no stint in the voting of money by Parliament for the purpose of dealing with the disease, but how had the money been spent? Proceeding, he said that the Government had at last had the wisdom to appoint an Advisory Commission, which had made certain recommendations. He strongly supported these recommendations, but what guarantee had they that these recommendations would be acted upon by the Government? (Hear, hear.) He said that the advice of the local Advisory Boards with regard to the movement of cattle had often been set aside by the Government, even when that advice had taken the form of the strengthening of the restrictions on the movement of cattle. He held that the Veterinary Department had not had a free hand in the matter of controlling of the disease; (Hear, hear.) He was going to support the resolution before the meeting. He had been in doubt, but after hearing all the arguments of the objectors who had spoken he found that the tendency was to let matters go on as hitherto, and this he certainly objected to.

Mr. B. B. Evans counselled the trial of the recommendations which had been made by the Advisory Commission. A new Government was about to come into office, and he thought they might wait and give this new Government a chance and see what they could do.

Mr. Mapstone said that if farmers paid more attention to tempering and isolating doubtful cases their losses from the disease would be far less. This had been his own experience. They must get at the root

of the disease—the tick, which could be overcome to a great extent by means of dipping.

Mr. Kirkman advised leaving the whole matter alone until Union took place: let them leave the matter in the hands of the new Government, and go into Union without a division on such a subject as that which they were now considering.

Mr. Dick was opposed to the resolution. He considered that it would be dangerous to give the Advisory Boards the powers suggested. It was rare that there was unanimity of opinion among the members of Advisory Boards. He thought they should leave the question of dealing with the disease in the hands of the new Government, who would, he felt sure, in the interests of the other provinces, spend money and do their best to eradicate the disease in Natal. Further, he thought it was unfair to those who had clean herds to allow the free movement of cattle as suggested. Further, he did not think laymen were competent to deal with the disease: for himself he was on the side of the professional man. He hoped the resolution would be thrown out.

Mr. Marwick thought that the fault in the past lay in the fact that there had been too many changes of regulations. Certain regulations should be drawn up and adhered to. He felt certain that it would be futile to pass the resolution, as the Government would be sure to disregard it.

Mr. Wiltshire said that if they relaxed the regulations they would be making a very serious mistake, in their own interests. (Hear, hear.)

Mr. Colenbrander thought that if the resolution were passed the effect would be that the Colony would revert to the position of two years ago.

The President at this stage said he thought the subject had had a good chance for a thorough ventilation, and that the matter might now be put to the vote.

This was agreed to, and the mover of the original resolution (Rev. Mr. Scott) then replied to objections.

Mr. Hosking's amendment was declared carried by 30 votes to 23. The amendment was as follows:—

"That this Union is of opinion that the present is not the time to alter the existing East Coast Fever regulations, especially as we are so near the coming Union of the Colonies."

The President, in reply to a question, said he would very much like to have the report of the E.C.F. Advisory Commission fully discussed and its conclusions adopted by the Conference. He accordingly asked permission to bring up the matter for discussion.

Permission was granted, and the discussion was postponed until there was a larger attendance.

CLOSING OF CAPE BORDER.

Mr. C. H. Mitchell moved, on behalf of the Lower Umzimkulu Agricultural Association:—

“That this Union would urge upon Government to immediately arrange with the Government of the Cape to open the ports of entry to East Griqualand and Pondoland for all traffic other than cattle, the present restrictions being both futile and disastrous to the welfare of the southern parts of Natal.”

He explained that the measures which the Cape Government had adopted to stop traffic between Natal and East Griqualand were futile because people could easily get in by making a detour of a couple of hundred miles. There were dozens of Natives going backwards and forwards every day. He considered it was merely a “trade dodge” on the part of the Cape Authorities in order to divert trade from East Griqualand—especially in mealies from Durban to the Cape ports. The position was a very serious one for the southern parts of Natal.

Col. Rethman, in seconding, said that the people in East Griqualand were absolutely imprisoned, being unable to send their produce to Maritzburg.

Mr. Lund thought the Cape Authorities were quite justified in adopting drastic measures for the control of the disease. He would oppose the resolution.

Mr. Marriott spoke to the same effect.

Mr. Lund said they would be treading upon dangerous ground in passing such a resolution as this. At the same time some relief was evidently needed, and he suggested that the matter be left in the hands of the Executive to endeavour to obtain relief.

Rev. Mr. Scott moved the following amendment:—

“That whilst this Union sympathises with the peculiar position of the farmers in Alfred County, yet it cannot interfere with the Cape quarantine regulations.”

Mr. Hosking moved that the Lower Umzimkulu Association should be advised to petition the Cape Authorities. (Dissent.)

Mr. Scott's amendment was carried.

PURCHASE OF HIDES.

Mr. Rancken, representing the Weenen Agricultural Society, moved:

“That this Conference is of opinion that the indiscriminate purchasing and carrying about of hides by Asiatics and Natives should be stopped.”

He considered that there was not sufficient discretion exercised in the granting of permits for the removal of hides.

Mr. Hancock said that no permit was necessary for the purchase of hides; a permit was required merely for the removal of hides from the district provided they were disinfected, but he held this disinfection was not properly carried out. (Hear, hear.) He thought the control of the purchase of hides should be placed in the hands of the Veterinary Department.

Mr. King asked if any of those who had spoken had ever seen a live tick on a dead hide? The real danger lay in the actual movement of the purchasers themselves about the country. (Hear, hear.)

Mr. Walton said there was a real danger in the carrying of hides, as they had no guarantee that the hides were not green.

Mr. Oldacre moved as an amendment:—

"That the control of the issue of permits for the removal of hides be placed in the hands of the Advisory Boards."

Mr. Comrie thought that a regulation should be put into effect prohibiting the removal of any hides from a farm without the owner's authority.

The amendment was carried.

PUBLICATION OF OUTBREAKS.

Mr. Dick moved on behalf of the Royal Agricultural Society:—

"That the Government continue to publish, as formerly, in the newspapers of the Colony, a record of all outbreaks of East Coast Fever."

Mr. Bazley seconded.

Mr. Dick moved the following amendment:—

"That the Government be asked to continue to publish, as formerly, in the newspapers of the Colony a record of all outbreaks of East Coast Fever; and also to publish from time to time a list of such areas and farms which may be regarded as having become clean. That each Magistracy be supplied with a map of the Colony showing the progress of the disease throughout the Colony and that statistics as far as possible be published in the *Agricultural Journal*."

This amendment was carried.

(To be continued.)

One asset of pig-keeping should not be overlooked. Pig manure is exceptionally rich, and after what is turned into pork there is a residue which can be used to the greatest profit on the farm.

The Living Bee.

By MARY RITCHIE,

President, Natal Bee-Keepers' Association; Natal Expert, South African Bee-Keepers' Association.

(Continued from Page 389.)

XXII.—HARVEST TIME.



THE summer is passing. The skies are clearer and bluer than they have been for many days, and the thin streamer clouds, like tufts of thistle-down, are a sign that the cooler weather is coming at last. In the garden the chrysanthemums are in bloom, over roof and verandah the flowers of *Bignonia venusta* fall in "a golden shower," and by the roadside gay clumps of *Leonotis leonurus* in tall, taller spikes, with tier above tier of orange velvet flowers, gladden the passer by. Wine for the birds the Kafirs call it as they watch the little honeysucker draining the nectar, but some years—just as is the case with the salvia—the deep-throated blossoms open to the bees.. Honey is scarce now except where the aloes are in flower. On these the bees work with a fine intensity, knowing that when the days are shortening it will be winter soon. Both for bees and bee-keepers the work is the work of harvest time.

All extracted honey should be bottled at once and tightly sealed, otherwise much of the aroma is lost. "What is aroma?" he asked her. "Aroma," replied the expert, is "the essence of flowers," but I doubt if the mere man was any the wiser! It is obvious at any rate that anything so subtle would be easily lost if exposed to the atmosphere, and on this account all honey, and especially show honey, should be bottled straight from the extractor.

A little ammonia in the water will put a shine on the bottles, and

they should be inverted and dried in the sun. I lost a prize once on account of my bottles. The judge said the honey was the best but the bottles were the worst. Even the babies asked, "Was the prize for glass?" All the same the prize was lost. Be careful then to purchase only clean glass and shine in the sun.

Attractive labels should be used. These, says a writer in "Gleanings," are easiest fixed by making a few hundred into a pack by gumming round the edges. Lay face down and paste the uppermost. The bottle is laid on the label instead of the label on the bottle. It is quite the quickest way.

Now comes the packing. Here a "cast-iron back with a hinge in it" is invaluable. Wrap each bottle separately to keep it clean and use abundance of packing. Given a hammer and nails, any Kafir boy will neglect his legitimate work—even his "scoff"—to knock them in, but watch him. Packing is tiresome work and might be left to someone else, for there are no stings attached, but it is the casting-off, and everybody—excuse the mixed metaphor—likes to be in at the finish.

Then there are the sections. Only a bee-keeper knows the joy of handling finished sections. Trimming sections is the high art of bee-keeping as well as crossing-sweeping, and some never attain to the higher reaches. "Oor Jock," explained the professional, "is a' right at a level crossing, but no a grain of use at a bit o' fancy work round a lamp-post!" Again, there are sections and sections, just as there are cauliflowers and cauliflowers. "That a cauliflower!" I heard the gardener exclaim, "How could you buy it, I would be ashamed to grow that, and if I did, I would be more ashamed to sell it." This should be the attitude of every worker, only the best must see the market.

If this is true of section honey it is even truer of extracted. And because I think the following words are seasonable and the subject important I quote them here. The article appeared in "Bee Gleanings," June, 1904. "All the surplus honey of 1902 came in in nine days, and in 1904, in about ten days. Now, if quantity had been my aim," says the writer, "I should certainly have set the extractor in motion, but as quality is my motto first, last and all the time, this honey was left on the hives until the autumn. I hope no one will think I saved labour by leaving my honey in their hives in this way. I went through all sorts of trials and tribulations, uncapping combs of thick, waxy honey, cross bees and robbers always on the alert; but my main object was attained. I secured honey of the highest quality. Had I set the extractor in motion during this rapid flow I could have increased my yield in bulk and pounds. By extracting late, I estimated a shrinkage, principally by evaporation, of at least one-third. All agree that if comb honey is put upon the market properly there will never be any trouble selling it. But do you know

that this big world has never seen the time when there was enough *fine fancy* liquid honey? Do you know there are some bee-keepers scattered all through the country putting honey on the market that is just as far from the real thing as soup made from a rooster's shadow is from the *real* thing. There are many wrong ways and only one right way of doing almost anything. If individuals or associations are to be successful they must be in earnest and look after *quality* in liquid honey. I have educated the people in this section of the country until I consider the disposal of four thousand lbs., a very small matter."

The honey packed and sent off. We are allowed a minute's breathing space, and that when the year is at its best—perfect autumn days and days of dream.

XXIII.—AUTUMN SWARMS.



Swarming is already reported from the Midlands, and beginners should be on the look out for swarms. Bee-keepers often wonder why bees should swarm at this time of the year. One can understand them leaving, amid the rise of sap, the rush and energy of new life that comes in the spring; one can imagine them leaving amid the heat and pressure of the summer, but that they should leave when days are shortening and nights are cold seems at first sight inexplicable enough.

Why should bees swarm in the autumn? Because it is autumn. Biologists tell us life is rhythmic and punctuated by the seasons. Swarming is an internal response to an external rhythm too strong to be disobeyed.

Autumn, though a time of withering and of dying, of burnt grass and falling leaves, is also a time of great abundance of life, of ripened fruits and scattered seeds. It is true the petals have fallen and the carpels withered, but enclosed in the heart of the plant are the living seeds, and on every side, in the very midst of decay and death, we are

reminded of the largeness, the bountifulness of Nature. In the same way, though a time of rest, of preparation for the winter, of gleaned fields and gathered harvests, it is strange to say the time of greatest restlessness. Here some strange primeval instinct makes the whole world kin, and we see that life in all its forms is one. The birds migrate, the lemmings rush to the sea, the bees swarm though there is snow on the Berg, the seals feel it and so do the salmon, even caged birds beat their wings against restraining bars, and humans exclaim, "There is an autumn feeling in the air—it's time to trek." (Holiday now are fixed for the summer, but in simpler days it was the autumn, and classes were not resumed till after harvest!) The bees then are no exception, for them to live is rhythmic punctuated by periods of rest and of work of repair and of waste, of struggle and of love. Love which in its biological sense means sacrifice; for the young come into their inheritance and the old rejuvenesce.

XXIV.—PREPARATIONS FOR WINTER.

The first autumn day (about the end of April on the Coast) we are arrested in the vicinity of the hives by the most pitiful groans. The drones have been expelled. Again and again of late the workers have taken them by the shoulders and run them out, but as persistently they have returned. To-night a watch is set; relentless sentries guard the entrance. They plead in vain. Nature has reduced their income: the bees must consequently reduce their expenditure.

The patience of the bees, says Mæterlinck, is not equal to that of man. One morning the long expected word of command goes through the hive: and the peaceful workers turn into judges and executioners. Whence this word issues we know not; it would seem to emanate suddenly from the cold, deliberate indignation of the workers; and no sooner has it been uttered than every heart throbs with it, inspired with the genius of the unanimous republic. One part of the people renounce their foraging duties to devote themselves to the work of justice. The great idle drones asleep in unconscious groups on the melliferous walls, are rudely torn from their slumbers by an army of wrathful virgins. They wake, in pious wonder; they cannot believe their eyes; and their astonishment struggles through their sloth as a moonbeam through marshy water. They stare amazedly round them, convinced that they must be victims of some mistake; and the mother-idea of their life being first to assert itself in their dull brain, they take a step towards the vats of honey to seek comfort there. But, ended for them are the days of May honey, the wine-flower of lime trees and fragrant ambrosia of thyme and sage, marjoram and white clover. Where the path once lay open to the kindly

abundant reservoirs, that so invitingly offered their waxen and sugary mouths, there stands now a burning bush all alive with poisonous bristling stings. The atmosphere of the city is changed; in lieu of the friendly perfume of honey the acid odour of poison prevails; thousands of tiny drops glisten at the end of the stings, and diffuse rancour and hatred.

And in a brief space, their appearance becomes so deplorable, that pity, never far from justice in the depths of our hearts, quickly returns, and would seek forgiveness, though vainly, of the stern workers who recognise only Nature's harsh and profound laws.

(To be continued)

Tree Planting.

By T. R. SIM.

(A Lecture delivered at the Conference of the Natal Agricultural Union, 1910.)

ANYONE on visiting the Maritzburg Railway Station can see at any time truck-loads of imported sawn timber passing up the railway to the country beyond—a sure sign that we are not yet supplying our own requirements, and that we are allowing some one else to get the benefit of the sawing as well as of the timber itself.

Those who know South Africa best realise how little is being done to change this to our own benefit, and yet how simple it is to do so. South Africa imports roughly £1,500,000 value of timber per annum, of which £250,000 is Australian hardwood, and £1,250,000 deals and other soft pine timber. We buy that while our own forests stand unused, because it is conveniently delivered in form ready for use; in fact, because somebody else has found it pays him to do our work for us, while we do not find it pays us to handle our own—we are too well off.

But let us consider how the future is going to affect that. There is not a civilised country in the world which is not using more timber per annum than the annual increase of the timber in that country's forests; that is to say, they are either using more and consequently depleting their stock, or they are using and exporting more with the same effect,

or they are, like Germany, using from their own stock only the annual increment, but they are also importing what balance they require. The natural consequence is that before long the world's timber supply will run short, especially of soft woods—and then where are we?

That this is not raising the price of timber more rapidly than it is doing is due to the fact that in the United States, in Canada, and in North Europe, the opening of a railway a few miles further inland taps a fresh spot, the lumberers make their living as before and there is only the few more miles freight to pay. But one day this will come to a dead end—no more spots to tap, and no sufficient re-growth to go back upon. Then, again, I say, where are we? In America and even in Europe there are numerous so-called forest areas which are mere skeletons. The good timber is cut out, but the useless old trees give it a semblance to good forest. Meantime some of the timber coming here travels 500 miles by rail and 6,000 miles by sea before it reaches our port.

The next move is to open up the virgin forests of the tropics, in which work I have been pioneering to some extent during the past few years, on the lower Zambesi and country beyond, but as happens in almost all tropical forests, the timber is almost hardwood, and consists of many kinds, so that it would be difficult for a mill there to send out shiploads of any one kind, as happens meantime with all large lumber mills in Europe and America. Taking the whole of the tropical forests, they would not for a long period supply the general demand elsewhere if it were dependent on them alone.

Then comes the crisis. Such countries as have been preparing for it will be more or less self-supporting; all others will be hopelessly stranded.

Now, what is the preparation going on? Germany and France have long worked their Government forests, so that the increment equals the felling, and to some extent further planting proceeds. Several other European countries and Japan work towards this. India and Cape Colony have forest services planting and protecting as fluctuating funds permit, but for the rest little can be said. In no case is there provision for supplying more than the country's own requirement. Even America, with all its up-to-date administrative machinery, burns ten acres for every one it plants; Canada plants mostly for farm protection: while it is stated that "ten times the amount of forest wealth has been destroyed in Canada through forest fires than has been cut by the lumbermen"; while Britain, paying £26,000,000 per annum for timber, and with any amount of suitable waste land available, has only lately begun a tree-planting scheme, at heart more a vote-catching expedient, and a provision for the unemployed and unemployable, than a genuine outlook for the

future, in which respect its methods does not contain even the elements of success. It is evident that in the near future South Africa will have to depend on South Africa alone for its timber supply. Now, what is the position? South Africa has less than one per cent. of its area under natural forest, and an insignificant proportion under plantations. Compare this with Europe, where almost one-third of its whole area is forest, distributed as follows:—Sweden, 48 per cent.; Russia in Europe, 38 per cent.; Servia, 32 per cent.; Austria, 30 per cent.; Germany, 26 per cent.; Norway, 24 per cent.; Belgium, 18 per cent.; Bulgaria, 18 per cent.; France, 16 per cent.; Great Britain, 4 per cent.; Portugal, 3 per cent., etc., and still Europe as a whole has to import $2\frac{1}{2}$ million tons of timber per annum in excess of her exports.

Germany alone, with 35 million acres of forests, and employing one-tenth of her population on forest work and timber manufacture, still imports $4\frac{1}{2}$ million tons of timber per annum, and the import has been increasing regularly and rapidly ever since transport allowed it, 60 or 70 years ago. All this shows that the proportion in South Africa is desperately small, and though the population is also comparatively small, the timber possibility from present sources is only an insignificant fraction of the requirement.

I have dealt so far with South Africa rather than Natal because, under Union, all must be considered together, but now comes a difference. Much of South Africa can never grow timber. The Cape Karoo, the flat plains of the south and west Orange River Colony, and much of the Western Transvaal, can never, under any circumstances, produce commercial timber profitably, and it remains, therefore, for Natal, where timber grows so easily, to make up this deficiency. Even though each Colony do all it can, there is no probability of overdoing the supply. I speak now more particularly of softwoods for building construction and other such purposes, deals, planking, pine beams matchwood, etc., which forms by far the larger portion of the imports.

The question naturally arises: Can we grow the kinds which are imported? In most cases, certainly not; or at least, not with advantage. They are slow-growing kinds used to a cold, wet winter and a fair rainfall all the year round, which conditions we cannot give. But we can grow others which answer the same purposes equally well, and which, when the timber famine comes, of which I have spoken, or even at the present time, we will be very pleased indeed to have.

These we can grow, and have grown experimentally for years, and have proved all that is claimed for them. We can definitely grow in Natal the softwoods required for building and similar purposes, and also

the hardwoods for whatever purpose required, and in this, as in mealies and butter and fruit and many other products it is only a matter of going about it systematically and persistently and patiently to ensure success.

It is no use saying that any one softwood is the best for the Colony, because conditions differ, and the suitable kind differs with the condition. But fortunately we have a considerable choice, and so can meet most cases. It is, however, in regard to all softwoods preferable to give a south, south-east or south-west aspect, if possible, as these almost always enjoy most rain and deepest soil, and usually are coolest and best protected. Still, it does not follow that trees will not grow to perfection facing the sun; often they do, growing to perfection more rapidly there than elsewhere, though, of course, the risk is greater. It is also necessary, for the production of commercial timber, to plant in forestal fashion—i.e., close enough to prevent the production of large side branches, each of which means a knot and a flaw in the timber, with correspondingly reduced value. On this account it is not reasonable to grow a line or two of trees and expect them to turn out clean timber except by pruning away the branches as these are produced, which again destroys the shelter value. Shelter belts, however, with abundant branches, give very good firewood and material for rough farm use. Or, a belt of considerable width, say, 100 yards, may be grown in dense condition, giving clean timber and still giving shelter, and if two such belts cross one another at or near right angles, shelter is produced from every wind, and if the centre is open a beautifully protected kraal is produced. Or, on the other hand, a square block set down anywhere in a field gives shelter the side be hollow instead of straight.

All such shelter planting, however, and indeed all planting of every kind, requires fencing, for it is absolutely useless to plant and then allow stock to destroy the trees. It is also necessary, in every case, to protect against fire, and to protect efficiently, for the Cedar fire showed that climatic emergencies have to be well provided against as well as simple fire, and that parsimony can be carried too far. A plantation should never be in a condition to burn on the ground from weeds, but with soft woods it usually does happen that if fire once gets in, it runs along among the branches without touching the ground, or if there be a good mulch of fallen leaves or dry humus, these may burn and carry the fire on, hence the need for special outside protection.

But, to revert again to which softwood kinds are most suitable, and speaking from present experience, I have no hesitation in giving equal first place to the two kinds, *Pinus pinaster* and *Pinus insignis*. Under usual circumstances *insignis* makes as much timber in 20 years as

pinaster does in 40 years, and the timber of both species answer all ordinary technical purposes if properly grown. On the other hand, *pinaster* is sure in most localities, even facing north, though better on other aspects, and stands in many places unsuitable for *insignis*, while *insignis* has an unfortunate knack of dying at an early age in many place. This, as I have frequently explained before, is its nature, not local effect. In its Californian home the same thing happens, 20 to 40 years is its full age, though occasionally a tree, or a clump of trees, stands out longer. Here that characteristic is maintained, though doubtless it is influenced at times by the climate, and we also notice that trees on shallow soil facing north may die from 15 years of age onward, while trees on deeper soil facing south seldom die till 25 or more years of age, and during that time they make as much timber as any other kind does in about twice the time. Consequently, in localities exactly suited for *insignis* that kind produces two crops in the time any other kind produces one, of the same value per crop. But in any locality suitable for pines, but not suitable for *insignis*, *P. pinaster* is the best kind to use, and in the upper districts it is the best in any case.

Of course, there are other pines, *P. halepensis*, *P. Canariensis*, *P. palustris*, and possibly *P. longifolia*, each of which may find a place here, though requiring more selection of site. Then for the coast and lower midland districts the various Arancaries are all worth growing for timber, when the plants can be had cheap enough—the timber is a good, useful softwood, when not too knotty.

For the higher districts *Cryptomeria Japonica*, *Cedrus deodara*, and *Callitris calcarita*, have the same qualifications—of course on selected sites while in the midlands, *Taxodium distichum* is a splendid tree for sheltered swamps which are not stagnant. Other softwoods might be mentioned, but the selection given is enough.

Turning now from softwoods to hardwoods, the Eucalypts, of course, claim first place, but here, as among the softwoods, it is just as difficult to place any one species as being decidedly the best. Kinds differ with locality and conditions, and they differ much in respect to the uses for which they are wanted. At the present time the main demand is for Transvaal mining timber, for which purpose no difference in price is given between the different kinds of gums, so long as the timber is straight and unsplit, consequently rapidity of growth to fit size counts largely. For such rapid growth no species exceeds, and probably none equals, blue gum (*E. globulus*), which, grown closely, gives a straight, suitable timber for props as any other kind, though when grown sparsely or in belts it branches too much, and twists and sometimes bends. Its

next competitor is *E. viminalis*, nearly equal in growth, more hardy, and quite suitable for the upper districts wherever there is soil enough. Neither of these two have high qualities beyond rapid growth, at least not until they are quite mature. But those who look a little into the future, find that that kinds which can be used for technical purposes are also worth growing, even though they do not grow so fast.

In Australia various gums are used for all kinds of purposes, standing in the ground as posts, or in water as piles; also for beams, house-building, mine-framing, wagon and carriage making, railway sleepers, furniture manufacture, and numerous other uses.

Many of these gum timbers are imported into South Africa yearly, under names which hide the fact that they are gums, such as Karri, Jarrah, Ironbark, Grey-box, Swamp Mahogany, Red Mahogany, Spotted Gum, etc., the total import of such gums being about £250,000 per annum. Australia is felling destructively, glad to get the ground to pay its way when being cleared for cultivation, and though the supply at present appears to them inexhaustible, one looking on with a knowledge of what has happened elsewhere, can easily see that the end is nearer than appears to the man on the spot, whose main interest, in any case, is present returns.

Now of the gums Australia produces, only one has definitely refused to do any good in South Africa, and that is the Jarrah, which, coming from the south-west corner, enjoys there winter rains which we cannot supply. There is a long list of gums—some useful and some useless, each having its own value and locality and requirements, so varied that I cannot enter on them to-night, but I will be pleased to advise any one at any time in respect to these.

Then we have Blackwood (*Acacia melanoxylon*), a grand furniture timber, used in Australia for panels, piano framing, etc., but here only wanted yet for mining props. Still when Maritzburg has all its new industries going, including piano making, furniture making, railway carriage shops, etc., it will find its proper demand in these industries as well as for carriage panels, railway carriage construction, etc., etc., and the farmers' part now is to grow the trees to be ready then.

Another beautiful timber of a softer class is *Grevillea robusta*, the carriage panels of which, shown by Ford Bros., and the furniture, shown by Reid, at the last Royal Show, excited intense interest; and still, when these manufacturers want more 12-inch material, they have to send to Australia for it, not because it does not easily grow to that size here, but because most of the local trees are too young to have reached that size.

1 We have also the various *Cupressus* and *Juniperus* kinds, which make

beautiful and useful half-hard timber, but have never been grown here in plantation order, and consequently are always branched too much for timber; these, however, suit from the Berg to the sea.

Then there is the *Cedrela*, the teak from which most of the importer cigar boxes are made, suitable wherever there is little frost. *Casuarina*, suitable for even the coast sand dunes, though also doing well up to the Berg, and yielding useful poles and valuable timber, and the oak, which, though not suitable everywhere, has its place in our economy.

These are only a few of the trees which suit Natal, and have value, but enough to show that we have choice to work upon.

You may have noticed that my list includes few of the British or North American kinds; the reason is all these require a wet winter and spring, and are practically commercial failures where they cannot have that.

I have made no reference either to wattle, which is in a different category, and has its separate treatment and uses from these; it may be quite the case that where wattle is at its best, it is more profitable than most timber trees, but it is also the case that even on wattle farms there are many localities not suited for wattles, but which may be beneficially occupied by other trees, especially poplar, which meantime imported in quantity for match manufacture, may be grown to advantage in many a vle almost to wet for anything else.

I have shown that South Africa is to be in a bad plight when foreign supplies run out, and that numerous kinds meeting all classes of locality and demand can be grown here, and I would now like to indicate what action could be taken.

In the other South African Colonies, the Government action, though influenced by the state of the purse, has so far been consistent, working toward an increased, but as yet totally inadequate supply: poor Natal has proved too barometric, making a spurt in 1889, and another in 1902 on my arrival, only to lapse again into its present condition.

The effect of Union remains to be seen, but meantime the private planter has his chance, first planted, first reaped.

In my report of 1902, after detailing the timber imports through Durban, and stating the increment shown by experience, I wrote "then to meet the total import a fully stocked standing area of 35,000 acres would be required, or on a 35 years rotation the afforestation of 1,000 acres per annum for the first 35 years, and the felling, and reproduction, either naturally or artificially, of an equal area per annum afterwards. More rapid planting would, however, be a decided advantage at first to allow an accumulation for emergencies, or increased demand, especially

as the stock continues to increase in value with age for many years, and the European population is expected to increase rapidly."

To these figures I still adhere, only with this difference, that we are now linked up with Bloemfontein, Kimberley, and the North, and as our area of distribution is largely increased, so is our requirement, besides which the demand for the mines has increased enormously. Taking then 2,000 acres a year as the reasonable amount planted in Natal regularly in the future, I am afraid that even under Union we have no reason at all to hope that this will be worked up to, even in any one year, by the Government.

Forestry is, in older and colder countries, rightly looked upon as a Government concern rather than an individual interest, on account of being too long-winded. But here, where trees grow with a rapidity unknown in Northern Europe or America, and come into marketable condition in a comparatively few years, another aspect is thrown on the question.

There are those to-day in Natal who are obtaining about £50 per acre for gum trees as they stand, 20 years old or thereby, on an expenditure of what would not be about £5 per acre, or a profit of, say, £2 5s. per annum for the whole period, and, considering how little is the initial cost, how little is the trouble required afterwards, and how sure is the result, I ask, is this not as well worth investing in as anything else that is going? Others are making more or less than this, in accordance with locality and age, the further up-country the more is the profit, and the present demand is rather for trees 6 to 8 years old than older.

With pine the result is even better if properly located.

To stir up some enthusiasm in this direction, Mr. Orlando Hosking last year brought before your Conference a motion that a series of prizes be awarded to the most successful tree-planting competitors under certain conditions. Not disconcerted by the fact that your Union did not have funds available, he pegged away and got several members to guarantee the amount required; the competition was duly advertised, and now your secretary informs me that 31 five-acre plots have been entered for competition by 18 competitors, and vouched for as planted.

That, gentlemen, means 155 acres planted by this simple expedient, and planted, too, in various parts of the Colony, so that if ever a fire does get hold of one it will not clear the lot, as happened at Cedara. But if there be one thing more than another which the committee desire to impress in connection with this competition, it is that every competition area shall be an object lesson in its district, cultivated and attended to as a sample of the grower's idea of what should be, not of what circumstances and accident produce. Also, that the object is to

produce timber, fit not only for mining timber, but also for the more highly technical classes of work, rather than mere shelter, rough stuff, and firewood.

I have to thank the planting public for the confidence they have shown in myself in this matter, for of the 18 competitors, 14 obtained practically all their trees from my own establishment, other two obtained about half from me, and raised the rest themselves, while two raised their whole quantity themselves. Someone says I may very well encourage tree-planting when I am making something out of it in that way, but I assure you that I feel my responsibility toward the Colony greater now than I did even when Conservator of Forests, for each of these is a living testimony either for or against me.

But, to return to my subject, the committee have been at it again, and have succeeded in obtaining and investing funds sufficient to ensure a similar competition yearly for the next few years, while I understand they also see their way to do something of the same kind in regard to fruit trees.

I feel quite sure that those who have planted will do so again, and that others, seeing their success, will join the ranks.

I do not, however, urge tree-planting simply because prizes are offered: that is a good inducement, but the thing is good enough in itself, and not nearly so slow in giving returns as is generally supposed.

Now, let farmers bank against future cattle disease or other ills by tree-planting, and whether as competitors or not, plant up the 2,000 acres per annum, which is Natal's necessary quota, and if advice from me is likely to be of any use to anyone at any time, he is freely welcome to it.

DISCUSSION ON THE LECTURE.

The conclusion of the lecture was greeted with loud applause.

A discussion followed on the characteristics of certain of the trees mentioned in the lecture, and as methods of planting, Mr. Sim giving the planting distance for most of the branching trees as eight feet.

A delegate asked what trees would be suitable for ceiling boards.

Mr. Sim replied that either *Pinus pinaster* or *P. insignis* were suitable.

In reply to further questions, he added that for wagon naves the best trees were blackwood and yellow-wood; and for sleepers the Karri and the various iron-barks (including the Torrville gum). He also said that gums grown in this country would be as satisfactory for sleeper purposes as the imported woods, provided they were allowed to attain the

same growth. The growing of yellow-wood was not recommended as a commercial proposition. *Pinus pinaster* would do as well as any imported pine for sleeper purposes, if creosoted in the same manner as was necessary in their case.

The *casuarina* was suitable for box-making, and it also made pretty furniture, though it was not strong enough to provide ideal beams or flooring.

In reply to the Chairman, Mr. Sim said the eucalypts grew, generally speaking, more rapidly here than in Australia, and in the right localities were capable of attaining similar development.

Replying to a delegate, Mr. Sim said there was a possibility of growing rubber trees on the coast, but not the slightest probability of making a penny out of them, especially as the price of rubber was likely to decline.

The Essenwood tree, Mr. Sim replied to another query, was very valuable for the fruit, from which a valuable oil could be obtained, and the timber was also good, and was well worth growing. The wood required to be soaked in water immediately after cutting, in order to prevent damage by insects.

Rev. Mr. Scott, in moving a hearty vote of thanks to the lecturer, said that the amount of interest aroused was proved by the large number of questions asked.

Hon. T. Hyslop seconded, and said the lecturer had drawn their attention to the sin we in this country had been committing in neglecting tree-planting as we had hitherto done.

A delegate suggested that the lecture should be printed in pamphlet form and placed on sale.

The Chairman said it would, perhaps, be possible to get a certain number of slips struck off. His advice to those present was to go home and plant, as he himself intended to do.

It was also suggested that the Editor of the *Natal Agricultural Journal* be requested to print the lecture in his pages.

In-breeding, lice, dampness, and improper food are the main causes of mortality amongst turkeys.

From the lowest mammal to the noblest man milk is the flesh-builder and giver of nerve power. It is one product that serves an indispensable purpose in the perpetuation of the human race. Let it, then, be pure and sweet at any cost.

Cape Fruit Export.

REVIEW OF THE 1909 SEASON.

IV.

THE following is the conclusion of the report by the Cape Government Trade Commissioner in London on the Cape fruit export trade (the first instalment of which appeared in our January issue):—

APPLES.

The quantity of apples exported from the Cape Colony is hardly worth mentioning, and is, I regret to say, apparently decreasing, as the following figures for 1908 and 1909 will show:—

Number of boxes exported, 1908 450

Number of boxes exported, 1909 201

I am at a loss to understand why the trade in this fruit has not made more progress in the Colony. The apple is one of those fruits which may be termed a “great article of commerce,” and the demand for it on the markets of the world is almost unlimited. If growers in the Colony can produce this fruit at a low cost they can rest assured that the markets of Europe will take all they can ship.

I was hoping to see the development of a large export trade in this fruit in the near future, and I still believe it to be possible.

During the year ending 30th June, 1909, the United Kingdom imported nearly three million cwt. of apples. A cwt. is equal to about three bushels, and a bushel of apples is worth about 7s. to 10s.

The following were the chief exporting countries:—

	Cwts.
Canada	1,270,891
United States of America	761,391
France	294,499
Belgium	270,034
Netherlands	53,694
Portugal	84,734
Germany	1,598
Tasmania	182,486
Victoria	50,214
South Australia	14,756
New South Wales	1,248
West Australia	53
Cape of Good Hope	49
New Zealand	22

To deal with the whole question of the apple trade in this report would be quite impossible. Volumes have already been written on the cultivation of the apple, the different features of the various varieties and their suitability for different climates, their seasons, diseases and the methods of their extermination, and on the packing, grading, transportation and marketing of this fruit. I need, therefore, only deal briefly with a few of these subjects.

Varieties.—On a former occasion I made inquiries from several large dealers on these markets as to the varieties which make the best price. I found that they were by no means unanimous in their opinion, but the following varieties were most favoured:—

Dessert.—Cox's Orange Pippin, Ribstone's Pippin, King of the Pippins (Adams Pearmain), Sturmer Pippin, New York Pippin (Cleopatra), Newton Pippin (Oregon), Blenheim Orange, Jonathan, Russet. Baldwin.

Cooking.—French Crab, Rhodes Island, Greening, Wellington.

It must be clearly understood that I only mention these varieties because they find most favour on the market here. Different countries favour different varieties, because they have learnt by experience those which can be most easily produced and which travel best. It is only by actual experience that growers in the Cape Colony can attain to similar knowledge.

Seasons.—Apples are imported into England almost all the year round, but we need only concern ourselves with the prices and conditions of the market at the time when it is possible to ship apples from South Africa. American, and especially Californian, apples arrive on the European markets up to almost the end of March, but during that month, in consequence of the lateness of their marketing season, these apples are much out of condition. The Australian, chiefly Tasmanian, apples commence to arrive about the first week in April.

The price obtained for fresh, well-packed apples is generally highest during March and up to the arrival of the Australian apples.

If I am correct in my assumption that Cape apples ripen about the same time as the Australian fruit, I contend that they should be able to compete on the market with Australian, since they have the advantage of at least 21 days start—that being the difference between the length of the respective sea voyages—and a slightly cheaper freight, *viz.*, 2s. per bushel box from the Cape, as against about 2s. 4d. from Australia. During these three weeks, Cape growers could ship about six shipments of 30,000 cases per vessel, or a total of 180,000 cases, without much upsetting the markets. After that we must compete on equal terms with the Australian fruit, but I see no reason why we could not do so, although the cost of packing is a point in their favour, as they have the advantage

of very cheap boxes made locally, whereas boxes for Cape fruit have to be imported. The figures I have quoted as possible Cape shipments are not excessive; the Australians think little of landing 100,000 bushels in one week.

Prices.—The prices vary much and depend on the variety, the condition of the fruit on arrival and the conditions of the market; but as a guide I think fair average prices would be from 6s. to 11s. per box of one bushel. I have estimated that the charges for packing material, labour, freight, dock and railway charges for this quantity of fruit would amount to from 4s. to 4s. 3d. per box. These figures do not, however, include the cost of the fruit.

Packing.—The best method of packing, as adopted by most countries, is in the standard size one bushel box, 10 in. deep by 11 in. wide by 20 in. long, the net weight of fruit contained therein being about 40 lbs. to 45 lbs. The use of small trays by Cape packers is costly and must be abandoned. The fruit, after having been carefully graded, should be wrapped in tissue paper, either plain or suitably printed, and then carefully and tightly packed in tiers with four to five apples in alternate rows, or five apples in every row in accordance with the size of the fruit. Very tight packing is most essential; no wood wool need be used excepting when necessary to tighten the packing. The packing and grading of apples is a fine art, which must be studied, and can only be learnt by experience. It cannot be adequately described in a brief report.

MELONS.

During the past season only about 216 cases of melons were shipped as compared with 1,494 cases during the previous year, the reason for this falling off being that during 1908 experiments were made in the shipment of several varieties, almost all of which proved to be bad travellers. There is at least one variety, however, which has proved to be quite a good traveller, and which generally arrived here in a very sound condition. This variety is called at the Cape the "Winter Melon," and is now known at Covent Garden as the "Spans-speck." It was first shipped by the Rev. S. J. du Toit, of the Paarl, and I have in my previous reports recommended growers to ship this variety only. It is round in shape, with a smooth, greenish-white skin, green flesh and has an excellent flavour. Unfortunately, however, its appearance is against it, and its real excellence is not known on these markets to buyers, who are accustomed to see a small oval or round yellow netted melon grown in a hot-house, which makes about 1s. to 2s. 6d. each wholesale. Buyers have, however, already become accustomed to the rather rough-looking Cantelope melon, which is an excellent red-flesh melon imported from Spain and France, making about 2s. 6d. to 4s. each wholesale, and I have every hope that in time the Cape Winter Melon will establish itself on these markets and that a profitable trade will result.

In consequence of the different sizes of melons it is rather difficult to suggest the best method of packing, but I may say that each melon should be wrapped in paper and packed tightly in boxes of convenient size with lots of wood wool. The size of the fruit should not be more than from six to eight inches in diameter, or about the size of an Edam cheese.

The question of the temperature most suitable for the transportation of the different varieties should be studied, and I recommend growers to take advantage of the cold storage experiments about to be carried out by the Government.

During the past season the following prices were made for Winter Melons when sound and of fair medium size:—

February	5s. to 6s. per doz.
March	10s. to 12s. per doz.
April	12s. to 13s. per doz.

SUNDRY FRUITS.

Grenadillas.—Small quantities of grenadillas have been received during the past few seasons from the Cape Colony; larger quantities arrived from Natal. These were packed in single-layer trays and made from 3s. to 7s. per tray. The variety of grenadilla grown in the Cape Colony and Natal, that is, the small brown, rather shrivelled variety, is not very acceptable to the English market as it is not known here. The variety better known is the large, yellow, smooth-skin fruit, which comes from the West Indies and other parts. I have on more than one occasion sent seeds of this latter variety to correspondents who communicated with me upon the subject, and I am looking forward with interest to the result.

Pomegranates.—During each season small quantities of pomegranates arrive from the Cape. This fruit, however, can only be sold in very small quantities. If they are large and showy they will be bought by fruiterers chiefly for decorating their shop windows, and for small quantities they will pay good prices, probably from 6s. to 12s. per box of 20. The Cape pomegranates are altogether a finer and more attractive fruit than those which arrive on these markets from elsewhere.

Quinces.—Small consignments of quinces have also come forward at different times. This fruit is comparatively unknown on these markets and only very small quantities can be sold. If they could become better known I think a fair market could be created for them as they are a good stewing fruit, besides which they might also probably be used by jam manufacturers; but in the latter case they must be shipped cheaply and in large quantities. With this object in view, experiments should be made by shipping small quantities packed in one bushel boxes in the ventilated hold of the ships.

Assistance to Farmers.

FENCING AND ERECTION OF DIPPING TANKS.

HOW LOANS MAY BE OBTAINED FROM GOVERNMENT.

THE Under Secretary for Agriculture (Mr. H. A. Hime) has issued a Government Notice, dated 26th April, drawing attention to the provisions of Act No. 20 of 1910, which empowers the Minister of Agriculture to make loans to owners of land, or to lessees or other occupiers of land, to assist them in the construction of dipping tanks for cattle and in the erection of fences *other than boundary fences* on their farms; and applications are invited from persons who desire to obtain a loan for either purposes. The Notice proceeds:—

A loan for the construction of a dipping tank will be limited to £100, and payment will not be made until the tank shall have been certified to have been satisfactorily completed and to be ready for use.

A loan for fencing purposes will take the form of a supply of material only, and in no case will a cash advance be made in respect of any such loan.

All loans will be repayable, together with interest thereon, at the rate of five per cent. per annum, by thirteen equal yearly instalments, the first of which will be payable two years after the date on which the loan is made or the fencing material is first supplied by the Government, and subsequent instalments will be payable at the end of each period of twelve months from the due date of the first instalment. Any borrower however, will be allowed to pay off his whole liability, with interest to date of payment, at any time if he should wish to do so.

It will be a condition of any loan to an owner of land that the unpaid instalments, with interest thereon, shall be payable by the owner for the time being of the land upon which the dipping tank is constructed, or the fencing erected, for which the loan is made, and in the case of a loan to a tenant, approved security for the proposed loan will be required; such security must take the form of a bond to be signed, in conjunction with the applicant, by two registered owners of land.

Applicants for loans should in every case furnish particulars as to the name of the farm on which the dipping tank is to be constructed, or

the fencing erected, as given in the title deed or other document, the name of the Magisterial Division in which it is situated, the grant number, the name of the registered owner, and any other particulars which will facilitate identification of the land, and in the case of an application for a loan for fencing purposes, particulars should also be given as to the length of the fencing which it is proposed to erect, the number of 14 lb. six-hole standards, droppers (to match the standards), coils of barbed and No. 8 and No. 12 galvanised binding wire, straining posts and gates (stating whether single or double, and the sizes) which will be required, and as to the name of the person to whom the materials should be consigned and the name of the railway station to which they should be sent.

Materials other than those specified above cannot be supplied.

Applicants for fencing loans will be required to arrange for the transport of the materials from the railway station to the farm at their own expense, and to also give an undertaking that the fencing will be erected without delay.

BOUNDARY FENCES.

The Minister of Agriculture is also prepared to supply fencing material, under Act No. 6 of 1907, to farmers who may desire to fence the boundaries of their farms, but it will be a condition of the supply of materials for boundary fences that applicants must state definitely that the whole cost of such materials, including cost of carriage and incidental expenses, shall be registered as a first charge and lien in favour of the Government upon their lands to be fenced, in terms of Section 4 of that Act, and applicants must agree to arrange, without cost to the Government, for the transport of the materials from the nearest railway station and for the erection of the fencing without any delay.

When applying for loans for fencing materials, applicants must state clearly whether the materials applied for are for the erection of boundary fences or of fences other than boundary fences, and in the case of materials being required for both purposes, separate application must be made.

The requirements of the Department being clearly set out in this notice, unnecessary correspondence and delay will be avoided by a strict adherence thereto.

PROVISIONS OF THE ACT.

For the convenience of our readers we reproduce herewith the main provisions of Act No. 20, 1910, under which the foregoing notice has been issued and which authorises loans by Government for the construc-

tion of dipping tanks and the erection of fences and extends the provisions of the East Coast Fever Acts. The substance of the Act is as follows:—

1. The Minister of Agriculture may upon application make loans to owners of land, or to lessees or other occupiers of land, to assist them in constructing dipping tanks for cattle and in erecting fences within the boundaries of their farms. Any person other than an owner must furnish approved security for the proposed loan. The Minister may in place of making a loan for purposes of fencing, supply fencing material, and in such case the price charged by the Government for such material, together with all cost of carriage and incidental expenses, shall for the purposes of this Act be deemed to be a loan. An account certified by the Chief Accountant of the Department of Agriculture shall be sufficient evidence of the amount of such loan. The regulations under this Act may prescribe all details and procedure in connection with the granting of loans, but no loan for the construction of a dipping tank shall exceed £100, and payment will not be made until the tank is satisfactorily completed and ready for use. The word "owner" as used in this Act means a registered owner or the holder under certificate of sale or allotment of land bought from the Government.

2. All such loans shall be repaid, together with interest thereon at the rate of five per cent. per annum, by thirteen equal yearly instalments, the first payable two years after the date on which the loan is made or the fencing material is first supplied by Government, subsequent instalments being payable at the end of each period of twelve months from the due date of the first instalment. Nothing in this section shall, however, prevent a borrower from paying off his whole liability with interest to date at any time if he should wish to do so.

3. In the case of a loan to an owner the unpaid instalments, with interest, shall be payable by the owner for the time being of the land upon which the dipping tank was constructed, or the fencing erected, for which the loan was made. Every such owner shall accordingly be liable for the instalments and interest as they fall due in the same way as if the loan had been made to him, and he shall be entitled to recover any sums which he may have paid from the person to whom the loan was actually made unless such claim has been mutually adjusted in the price of the land or otherwise.

In the case of a loan to a tenant, he and his successors in the tenancy shall, together with the sureties, be liable for the instalments falling due during the tenancy and for the interest thereon, and any further instalments with the interest thereon shall be payable by the owner for the time being in accordance with the provisions of the first paragraph of this section.

4. (1) Section 6, and the reference thereto in Section 11, of Act No. 32, 1908, are hereby repealed.
- (2) The Minister, acting with the advice of the Advisory Commission established under this Act, may by notice in the *Government Gazette*, divide any Magisterial Division into two or more districts for the purposes of this section.
- (3) The Magistrate of any Division shall, upon receiving a requisition signed by not less than fifteen persons, being registered voters and owning cattle in the division, or in any such district as aforesaid, call a meeting of cattle-owners being registered voters of the Division or district, as the case may be, to consider the question of enforcing the dipping or cleansing of cattle.
- (4) Notice of the time and place appointed for the meeting shall be published four times in some newspaper or newspapers circulating in the Division, the first notice being published two weeks at least before the appointed time. The Magistrate or his deputy shall preside at the meeting. Any person being a registered voter and owning cattle within the Division or district, as the case may be, may attend and vote at the meeting. This meeting may be postponed to a convenient date if necessary on account of stress of weather or for any other reason which the Magistrate may consider proper. Notice of such a postponement of the meeting shall be published as aforesaid at least twice.
- (5) If the meeting be attended by not fewer than thirty persons entitled to vote (of which the Chairman shall decide), and a resolution be passed by the majority in favour of compulsory dipping or cleansing, the Magistrate shall report the same to the Minister, who shall thereupon issue an order making it compulsory for all cattle within the Division or district, as the case may be, to be dipped or cleansed in such manner and at such intervals as he may prescribe, and such order may be enforced by the several advisory committees within the Division or district, or by any persons whom the Minister may direct to execute such order.

If the meeting be not attended by the prescribed number of qualified persons, or if such resolution as aforesaid be not passed, the Magistrate shall not be again required to convoke a meeting within the next three months.

- (6) For the purposes of this section every municipal borough or township established under Law No. 11, 1881, or a like Act, shall be regarded as a district within the meaning of the preceding sub-sections, and the remainder of Magisterial Division in which such borough or township is situated shall be treated as if it were an entire Division.
- (7) In every borough or township in which a resolution has been passed, and an order made by the Minister as aforesaid, the Town Council or Local Board shall be required to construct and maintain so many good and sufficient dipping tanks for cattle as may in the opinion of the principal officer of the Veterinary Department be required for the dipping of cattle in such borough or township.

Should any Town Council or Local Board fail to construct the required number of tanks within a time to be notified by such officer after the issue of such order as aforesaid, or to maintain them ready and fit for use, the Minister shall be empowered to construct such tanks, or to repair or maintain them, and the expense incurred shall be recoverable from the Town Council or Local Board.

- (8) The Natal Native Trust shall in like manner be required to erect and maintain dipping tanks in any Native location or mission reserve whereof they are the trustees, situated within a Division or district in which a resolution has been passed and an order made as aforesaid.

5 The Governor in Council shall in the month of March in each year, or so soon thereafter as may be, appoint five persons having a practical knowledge of cattle farming, and not being in the Government employ, to be an Advisory Commission the function whereof shall be to offer advice to the Minister upon any subject connected with the administration of the East Coast Fever Acts and the suppression of the disease. The Commission may elect its own chairman.

6. Sub-section (a) of Section 1 of Act No. 32, 1908, is hereby repealed, and in place thereof is enacted the following sub-section:—

- (a) To require any person to erect one-half of such boundary fences on his farm or land as they direct, and to keep the same in good order and repair. The fences shall be of such a kind and standard as the committee may prescribe, but not of a more expensive character than those required by the Fencing Laws Nos. 30 and 36, 1887.

7. The Governor may from time to time make any regulations required for the purposes of this Act.

The Position of East Coast Fever.

OUTBREAKS DURING APRIL AND MAY.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 22nd April to 19th May, 1910:—

Dundee Division.—Outbreaks on the farms "Coalfields," east of main line, "Gladstone," east of main line and north of Dundee-Vryheid.

Alexandra Division.—Outbreaks on the farms "Dingle," "Mtabobovu," "Location No. 1."

Ladysmith Division.—Outbreaks on the farms "Putena Spruit," west of main line, "Lot 86, Town Lands," east of main line, "Twyulaar," west of main line, "Daan's Kraal," east of main line, "Colworth," west of main line, "Riverside" (sub-division of), "Klipfontein," west of main line.

Krantzkop Division.—Outbreaks on the farms "Doornhoek," "Spring Grove" (sub-division of "Varken's Vlei").

Lion's River Division.—Outbreaks on the farms "Curry's Post" (sub-division of "Thomasville"), east of main line, "Valhalla," "Lyndedock" (sub-division of "Wilde Als Spruit"), east of main line, "Esseldene" (sub-division of "Petrus Stroom"), west of main line, "Tweedie Hall," west of main line, "Sherwood," east of main line.

Camperdown Division.—Outbreaks on the farms "Stoke" (sub-division of "Lux"), "Strathfieldsaye," "Lovo Dale," "Philpot Place," "Ismont," "Emerald Hill."

Richmond Division.—Outbreaks on the farms "Blackwood Grove" (sub-division of "Kruisfontein"), "Enon," "Long," "Willow Park," "Richmond Commonage," "Lincoln," "Stackpool."

Izopo Division.—Outbreaks on the farms "St. Michael's," "Hancock Grange," "No. 2," "C 5," "East Wolds," "Location No. 7," "Weathercote," "Location No. 8," "Cromwell," "F. P. 14," "F F," "S. 31," "Mabehlana," "Clifton," "Rocky Glen," "Stae Braes" (sub-division of "Waterfall"), "McKenzie," "Springbrook," "Fairfields," "Nqodi."

Estcourt Division.—Outbreaks on the farms "Gourton," west of main line, "Vaai Plaats," west of main line, "Koplaagte," west of main line, "Erasmus Kraal," east of main line, "Plessis Laager," east of main line, "No. 7," west of main line, "Compensation" (sub-division of "Vaai Plaats") west of main line, "Klipfontein," west of main line, "Deel Punt," west of main line, "Retreat," west of main line, "Vaakingsfontein," west of main line, "Longwood."

Bergville Division.—Outbreaks on the farms “Acton Holmes,” “Betheny,” “Hongerspoort.”

Lower Umzimkulu Division.—Outbreaks on the farms “Olympas,” “Brasfort Flats,” “The Remains,” “Waterfall.”

Newcastle Division.—Outbreaks on the farms “Mooi Plaats,” west of main line, “Rooi Vaal,” west of main line.

New Hanover Division.—Outbreaks on the farms “Kopperbult,” “Welgelegen,” “Jammerdaal,” “Foxon.”

Umvoti Division.—Outbreaks on the farms “Craiglands,” “Menneheim,” “Redcliffe,” “Craigie Burn,” “Overvloed,” “Eland’s Dale” (sub-division of “Overvloed”), “Hartebeestvlaakte,” “Sophiadale.”

Impendhle.—Outbreaks on the farms “Vanclose,” “Clarmont,” “Moru,” “Boschberg,” “Coquidale.”

Polela Division.—Outbreaks on the farms “Elnsel,” “Location No. 2.”

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of the Victoria County, Vryheid, Ngotshe, Babanango, Paulpietersburg, and Umsinga.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

A FACT, which is receiving much attention from biologists at the present time, is that a filter-bed does not reach its normal state of efficiency, or technically “become ripe,” until it has been in use five or six days; this is believed to be due to the formation on the surface of the sand of a gelatinous microbic tissue (soolglæa) produced by bacteria.—ALLAN GREENWELL, A.M.I.C.E., F.G.S., and W. T. CURRY, A.M.I.C.E., F.G.S. (“*Rural Water Supply*”).

IRRIGATION AND FROST.

The effect of irrigation is sometimes found to render both vines and trees subjected to it very susceptible to the frosts and severe weather of winter. This disadvantage seems to be a necessary adjunct, or set-off, to the advantages gained by the practice. Thus, a severe winter has been known to destroy whole groves of olive trees that have been irrigated, while scattered trees, not so cultivated, have escaped.—HENRY STEWART (“*Irrigation for the Farm, Garden, and Orchard*”).

AUTUMN PLOUGHING.

In South African practice the autumn ploughing of vlei soils to a steep, open furrow is to be recommended, and in the case of new lands should be followed by shallow cross-ploughing in the interval between the early and late spring rains. When brought into good tilth and heart, too much ploughing may do harm by exposing soil and fertilisers too freely to the air, and by tending to pulverise the earth too finely. The destruction of weeds in some cases will render a second ploughing obligatory.—E. R. SAWER, *Director of Div. of Agr. and Forestry, Natal Dept. of Agric* ("Cedara Memoirs," Vol. I.).

VALUE OF COWPEAS.

Perhaps no single agricultural crop is of greater economic importance to the people of the United States than cowpeas, yet its cultivation is comparatively recent in this country. Each year the crop is better appreciated, and its area is being rapidly extended. While the cowpea is not a true bean, it is a valuable forage crop and a great soil renovator. The seeds are valuable as grain, the hay is equalled only by alfalfa (lucerne), and as a producer of organic matter for green manuring it is unsurpassed.—L. C. CORBETT, *Horticulturist in Charge of the Arlington Expt. Farm, U.S. Bureau of Animal Industry*.

DUST BOXES FOR POULTRY.

Chickens never wash, as many other birds do, but cleanse themselves of insects by wallowing in soil. Where board or cement floors are used, some means for dusting should be provided during the winter months. For a flock of 50 to 60 fowls a dust box 3 by 5 feet or 4 by 4 feet will be found large enough in most instances, and should be placed where it can be reached by sunlight during as much of the day as possible. Fine, light, dry dust is the best, but sandy loam is good. Road dust is recommended by many, but it is apt to be filthy. Coal or wood ashes may be mixed with the soil if desired.—G. ARTHUR BELL, *and Assistant Animal Husbandman, U.S. Bureau of Animal Industry*.

THE GRADE OF A DITCH.

The matter of grade for a ditch is one which depends so much upon circumstances as almost to preclude rules. It is safe, however, to make the grades as light as possible to avoid "silting up" or settling. Cutting may be called perpetual motion, for if once begun it seems never to stop. The ditch gradually gets lower and lower until the water cannot be got out of it at all, and it must either be abandoned or have falls built in it to keep the flow near the surface. As far as possible keep the grade

uniform, as changing the grade tends to cause both cutting and silting. A ditch for irrigation on a farm should always be much larger than the actual demands require.—LUTE WILCOX (*"Irrigation Farming"*).

FEEDING TURKEYS.

Give the fattening turkeys all they can eat four times a day, from the time when you commence full feeding until twenty-four hours before slaughtering time. The first three of the daily meals should be of cooked potatoes and mealie meal, or of mealie meal scalded with milk or water, and the last of whole maize, varied with wheat or buckwheat. Always use maize a year old: new maize causes much trouble and may kill them. Give the first meal as soon as possible after daylight, and the last just before dark. Feed each time all they will eat up clean, but leave no food by them. Feed the pounded charcoal occasionally, and keep a supply of gravel where they can help themselves. Twenty days of such feeding will put turkeys that have been growing and in good health in the best possible condition for market.—HERBERT MYRICK (*"Turkeys and How to Grow Them"*).

GREEN MANURING.

The most important object achieved by green manuring is the addition of humus to the soil. Other things being equal, the best green manure crop is that which furnishes the largest amount of material which will readily decay in the soil and thus form humus. There are, however, additional ways in which such a crop may be beneficial. Deep-rooted plants are decidedly preferable to shallow-rooted ones because they penetrate into the subsoil. In this way air and water find entrance, especially after the roots decay. Thus in a way every deep-rooted plant is a subsoiler. It is also supposed that such plants, especially when ploughed under, tend to enrich the surface soil with potash and phosphorus from the subsoil, thus bringing these substances within the reach of shallow-rooted plants.—C. V. PIPER, *Agrostologist in Charge of Forage Crop Investigations, U.S. Bureau of Plant Industry.*

PRESERVING EGGS FOR INCUBATION.

The following method has been proved by experience to be as effective as any for preserving eggs for incubation, but the same measure of success must not, *by any means*, be expected from such eggs as from fresh ones:—Wrap up each egg in a square piece of damp proof paper in such a way that all the edges of the paper are drawn to one end and tightly twisted; thus excluding the air. Grease-proof or butter paper, which may be obtained of most grocers, is suitable for wrapping the eggs. Pack the

latter, so wrapped, small ends up, tightly into conveniently sized boxes, and when full screw down the lid and date the box. If moderate sized boxes are used, those filled first can be opened first for use. Keep the boxes in a cool, dry place, and turn over every day. Eggs have been preserved in this simple way for nearly a year, and have afterwards hatched chickens. Great care should be taken that the eggs put down are perfectly fresh, but they should not be wrapped up and packed in the boxes warm from the nest. Allow them to cool first.—J. H. SUTCLIFFE (*"Artificial Incubation and its Laws"*).

REQUIREMENTS OF SILOS.

The fundamental principle in the preservation of green forage when placed in a silo is the exclusion of air. It is the purpose of any silo, regardless of its construction, to exclude air as far as possible from the silage and in this way prevent decay. To prevent the air from reaching the silage, all silos must have air tight walls. These must be rigid enough not to be sprung out of shape by the pressure of the silage, permitting air to enter next to the wall. Not only the walls but the doors also must be perfectly air tight. . . . In addition to being air tight the silo wall should prevent the loss of moisture from the silage. Porous walls, which sap the juices from the silage and transfer the moisture to the outside of the wall where it will be evaporated, cause the silage to become dry and mouldy for a considerable distance inward. The setting of silage in contact with rough walls tends to form openings in the silage which invariably induce the presence of air. Walls which are poor conductors of heat are also very desirable in order to prevent freezing of silage next to the walls.—M. L. KING (in *"The American Thresherman"*).

Exchange Reviews.

WHAT OTHERS ARE THINKING AND DOING.

MR. LIONEL COHEN, of the Chemists' Branch of the New South Wales Department of Agriculture contributes to the February number of the *Agricultural Gazette* of the Department an interesting article on "Bare Patches: Their Causes and Treatment." In the course of his article he mentions that three cases of bare patches at widely separated locations in New South Wales have been found in which the sterility is concomitant with a considerable excess of manganese over the surrounding soil. He remarks that, "some farm crops appear to tolerate comparatively large amounts of manganese, the simplest method of utilising the bare patches would be to cultivate such crops only on them. The bare patches at Coolabah Experiment Farm are apparently due to the presence of calcium

chloride, caused probably by an impervious subsoil, which exists in places at a depth of 2 or 3 feet. This substance, being extremely soluble, would be removed from the top soil if the drainage were thoroughly efficient in these patches. The sterility of the Coolabah bare patches may also be partly caused by the decomposition of the calcium chloride by the plant in its search for lime, giving rise to hydrochloric acid. That being the case, thorough and liberal dressings of lime should restore fertility by inducing a more neutral condition, and rendering unnecessary the assimilation of the calcium in the calcium chloride by the growing crop.

Robusta Coffee.

The Department of Agriculture of the Federated Malay States have issued a bulletin (No. 1) on the *robusta* species of coffee from the pen of Mr. W. J. Gallagher, M.A., Director of Agriculture. *Coffea robusta* was discovered wild in the Congo region by Emil Laurent in 1898. The plant was taken up commercially by a Brussels horticultural firm and named *Coffea robusta* by them. Mr. Gallagher states that *robusta* differs in many ways from the well known *liberica*. The habit is somewhat different. *Robusta* grows more rapidly. An eight months old *robusta* plant is much larger and has more branches and leaves than a year old *liberica*. The branches of *robusta* are longer and have a tendency to bend down towards the ground so that the bush is rather umbrella-shaped. Gourmandisers and suckers are fewer than on *liberica*; the leaves are a lighter green, thinner, and larger in size.

Robusta bears more berries in a cluster than *liberica*, often over sixty; they are much smaller, but the beans are almost as large as the skin is thinner. On an average ten pikuls of liberian berry give one pikul of market coffee. On the other hand only four pikuls of *robusta* berry are required for a pikul of market coffee. Though many more berries go to a pikul than in *liberica* the greater number in a bunch makes the picking if anything cheaper.

Reports from the home market show that it must be heated and ground in a manner somewhat different from other coffees, and that as to quality experts are inclined to put it nearly on a level with best Santos. At present the price is about \$25 a pikul, but this will hardly be *robusta* in the Dutch Indies, mainly in Java, and it is possible that the price may fall to \$17 or \$18.

Killing Weeds with Carbon Bisulphide.

Mr. F. V. Wilcox, the Special Agent in Charge of the Hawaii Agricultural Experiment Station, discusses in a recent press bulletin the efficiency of carbon bisulphide for the purpose of killing weeds. During

the past year a number of experiments have been made with carbon bisulphide in studying its effects upon various herbaceous and shrubby weeds. In these experiments, the amount of carbon bisulphide used varied according to the size of the plant to be destroyed. On small-stemmed plants like *Crotalaria*, about a teaspoonful of commercial bisulphide was poured down the stem, from about six inches above the ground. The amount was increased, for larger plants, up to two teaspoonfuls for guava bushes three or four inches in diameter. The plants upon which most of the tests were made were lantana, guava, prickly-pear, *Stachytarpheta dicotoma* (one of the plants known by the native name Oi), and *Crotalaria incana*. In all cases, as just indicated, the carbon bisulphide was poured on the stem at a point about six inches above the surface of the ground. On most plants carbon bisulphide shows no effect until after the lapse of a considerable period; on large guavas sometimes two or three months. The effect of pouring carbon bisulphide on *Crotalaria* was to cause the death of the plant, root and branches, within four to ten days. The plants remain green, and apparently normal, until shortly before death when the leaves suddenly turn yellow and shrivel up. If the plants are then carefully removed from the soil it is found that all of the root-system is dead and the inner tissues of the roots and lower part of the stem are brown, or otherwise discoloured.

Apparently, the effect of carbon bisulphide, when applied directly to the stems of plants, is due to artificial freezing. As is well known, the liquid volatilises almost instantly and cools the surface so suddenly that the living bark is destroyed. It seems also to exercise a poisonous action, otherwise it would be difficult to explain the complete destruction of the roots to their tips, in some instances, six or eight feet from the point where the carbon bisulphide was applied. It was found, for example, that guava bushes would live for five to seven months after the bark and cambium had been entirely removed from the surface of the ground up to a height of two feet. Moreover, the destruction of the bark at the base of the trunk by concentrated sulphuric acid was not sufficient to cause the death of the guava bush for about six months. Apparently, therefore, carbon bisulphide causes the death of plants by its freezing effect and also by a poisonous action. Mr. Wilcox reminds us that in using carbon bisulphide the fumes, if inhaled continuously, may produce serious effects upon the workmen, and also that the material is highly inflammable and should be protected from accidental flames. The effect of the fumes upon workmen include headache, dizziness, hysterical excitement, and, finally, a rather serious weakness, a feeble pulse and other symptoms of prostration. If it is used, therefore, in the eradication of weeds, these effects should be borne in mind in order to protect the workmen.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

LOWER TUGELA.

THE annual meeting of the Lower Tugela Division Association was held at Stanger on 15th April, the Vice-President, Mr. A. E. Fos, presiding.

The President (Mr. W. R. Hindson) referred to the death of Mr. David Brown since the last meeting, and stated that Mr. Brown was the first president, and held that office for four years. He took a keen interest in horticulture and agriculture matters, and had given the Association the benefit of his knowledge and experience. The speaker moved a vote of condolence with the widow and family of Mr. Brown, and the resolution was passed by the members standing.

The following annual report of the President was read:—

In my report for last year, I referred to the atmosphere of suspense in which we were then living, owing to the impending change in the political relations of the various Colonies of South Africa, which was exciting such keen attention and discussion throughout the country at the time.

The union of the four interested Colonies into one South African Dominion is now an accomplished fact, and although the convention on which that Union is based was practically unanimously agreed to by the electors throughout South Africa, and the Convention itself hailed as a masterpiece of Statesmanship, the feeling of suspense and anxiety as to how this Union is going to effect us here in Natal has not altogether abated. I think I may say, that to many of us the outlook is not quite as bright and hopeful as it was when the Convention was concluded. There are one or two clouds in the sky. The utterances of different political leaders incline us to fear that racial feeling is not quite dead, and this element, if allowed to influence practical politics in any direction, will be subversive of the best interests of the Union in all its parts.

Another cloud, which more nearly affects us in Natal, is the present precarious position of the labour question—a question which we understand is left for the forthcoming Union Parliament to settle, in so far as the continued introduction of indentured Indians is concerned.

Apart from any question of the stoppage or non-stoppage of indentured Indian labour, in the near future, the present labour supply in Natal and Zululand is not sufficient for the industries that are now

established. The soil and climate of Natal are distinctly favourable not only to the industries alluded to, but to several others which would be undertaken were we assured of a permanent supply of reliable labour at such a price as would yield a fair profit on the undertakings in which it would be engaged.

The report of the Commission on Indian Indentured Labour was absolutely convincing of the necessity of the continuation of Indian immigration. To this report was added a rider recommending the indenturing of young Natives; if this could be done, it would materially relieve the situation and prove advantageous not only to planters and farmers, but to the Natives themselves.

But indenturing Natives—even if it could be accomplished—would not for many years to come, if ever, be a satisfactory substitute for the present system of importing indentured Indians. This is very distinctly felt by all who knew anything about the labour requirements of the Colony, present and prospective.

It would be well at this juncture for planters to combine and organise labour agencies to recruit Native labour for work on the estates. This, at all events, would test the position with regard to this class of labour, but it must be emphatically impressed upon the legislators of South Africa, everywhere, that Natal cannot do without Indian indentured labour.

Look at our crops for the season just coming to an end—what has been done?—and then think what more could be done with a plentiful supply of labour.

Take our principal Coast industry—sugar the season has been a most favourable one for the growth of this staple. The output from the mills between Tongaat and the Tugela is estimated at 15,000 tons, and this will be more than doubled by the sugar produced in Zululand. This industry, in addition to the shortage of labour alluded to, is severely handicapped by the lack of transport and the deficiency of manufacturing equipment along the Coast. To meet these drawbacks, early cutting of the cane has to be resorted to, as it is thought better to cut prematurely than to be unable to deal with it at the end of the season. It is estimated that, between Tongaat and the Tugela alone, some 2,000 tons of sugar will have to remain on the field until next year, and as it is further estimated that the 1911 crop will be fully fifty per cent. more than that of the present season, if no new mills are erected, or those in existence considerably enlarged, there will be a very heavy loss to the planters during the next two years.

If a sufficient supply of labour for present and future were assured, capital would very readily find its way into Natal for the equipment and extension of present industries, as well as for the development of others.

In connection with the sugar industry, there is an important point, which has already been discussed by our Association, that is, the necessity for having new varieties of cane introduced on to the land. "Upa" cane has done exceedingly well so far on the Coast, but is not the danger of having "all our eggs in one basket" to be feared for the sugar industry? Are sugar planters convinced that they have got the best and most suitable variety of cane to be had? If not, it would be well to obtain and experiment with other varieties before signs of deterioration in our present cane are evident.

TEA.

The tea industry on the whole has not made satisfactory progress. In the early part of the season, owing to unfavourable weather conditions, planters feared they would not reach their estimates, but latterly better conditions have prevailed, and the shortage in the beginning of the year will, it is hoped, be fully made up. It is satisfactory to know that the quality of the output of the various estates shows a distinct improvement on that of previous years. That this is appreciated by consumers is shown by the fact of the increasing demand for the South African product. The supply of the finer grades of Natal tea last season was considerably less than buyers' requirements, and the same state of things is likely to happen again this year. Very unfortunately, however, for planters, competition in the tea trade is so keen and the prices, both of the imported and the locally produced article, cut so low, as to render the industry unprofitable to those engaged in it. The industry received a fatal blow at the Bloemfontein Customs Conference, when the import duty on overseas tea was reduced from *sixpence* to *fourpence* per lb. This change was quite uncalled for, and it was a gross injustice on those who had invested their capital—permanently—under the protection that existed before the reduction of the duty took place.

MEALIES

Mealies have come on well on the Coast, but owing to difficulties of transport and low prices obtained, the area of cultivation has been further restricted. Indians, who are the principal mealie producers, now find it more profitable to plant sugar cane and other crops.

There is one industry, which I alluded to in my last year's report, *viz.*, "dairying," which, with the elimination of stock diseases, should be a very profitable one on the Coast. With our perennial supply of rich green grass and with good stock, and proper care and attention in every department, milk and milk products should yield a rich reward.

This brings me to the present condition of our district with reference to cattle diseases. The district is now, and has been for a considerable time, practically free of East Coast Fever, and I have not heard of any other trouble amongst cattle. Surely the time has now arrived when the

re-stocking of this district with clean and suitable cattle may be undertaken safely. The urgent need of ox transport is apparent on every side. The absence of it is still causing serious loss to large and small cultivators alike. I would recommend that Government be urged to institute an enquiry into the present state of the district, with a view to the immediate re-opening for the introduction of horned stock—under Government supervision. It is well known that cattle from elsewhere have been brought into the district within the last twelve months; these cattle have done well, and there has not been the slightest sign of a recurrence of the East Coast Fever. The season for horses has not been a good one, so-called Horse-sickness has been very prevalent, and although the system of “smoking the stables” has done a great deal to check this disease, yet a good many deaths of horses have taken place. Very fortunately “Lymphangitis,” with which we were threatened in the early part of the season, has not made any headway; in fact, you may take it, that the district is now free of this disease.

I have left the consideration of the present position and attitude of the Native population over to the last, because, to my mind, this, if it is not just now, will be, before very long, by far the most serious problem we shall have to deal with. But, even now, what are the Natives doing in our own district? What character do they bear collectively? I am told on every hand that the Natives are becoming more immoral, less law-abiding and less respectful to the white man every day. I do not hesitate to say that the Natives living on private farms and estates are simply “cumberers of the ground” and a nuisance. They “toil not, neither do they spin,” and, what is economically worse to the landowner, they don’t pay rents. As the European population on the land increases every year, and extension of cultivation takes place, a process of shifting and moving goes on, and the Native is being gradually edged out of the way by the inevitable law of process. But this process is having a dis-affecting and demoralising effect on the Native mind, and a wise and firm supervision, with a rigorous administration of the law, is absolutely necessary to prevent serious trouble. I would not consider this matter, only from the economic and sociological standpoints, but also from the point of the welfare of the Natives themselves. We Europeans have a great responsibility towards these people, and that responsibility calls for, not only discretion and absolute fairness in our personal dealings with them, but we must enforce, both by our own conduct, and by our unflinching application of the law, a greater respect for the white man and for the laws that govern the community.

In conclusion, I have again to thank our ever accessible and esteemed secretary, Mr. H. Curtis Smith, for his assistance during the year. Mr. Smith certainly does more than anyone else to keep the Association in existence, with, I am afraid, only meagre encouragement.

A balance sheet showing the financial position of the Association has been prepared, and will be now read by the secretary and then laid before you.

The Secretary read the balance sheet, showing a balance in hand of £5 7s.

The Chairman having proposed the adoption of the report, Col. F. Addison seconded, and in doing so drew attention to the remarks in the report regarding the Natives, and said matters in that respect were becoming serious. He had been trying to get men punished for offences against himself such as trespassing, pulling down fences, setting fire to cane and barracks and robbing of gardens, and they were beginning to retaliate. He was sorry to have to speak in that way regarding the Natives, but he could only put it down to the weakness of the officials in the district in administering the law and the failure to detect the criminals. It seemed they would have to take the law into their own hands shortly, with the possible result of some white man committing a crime against the Natives.

The following officers were elected:—President, Mr. A. E. Foss; Vice-President, Mr. W. R. Hindson; Hon. Secretary, Mr. H. C. Smith; Committee, Messrs. F. Addison, T. G. Colenbrauder, A. S. L. Hulett, J. G. Stuart.

MID-ILLOVO.

The fifteenth annual meeting of the Mid-Illovo Farmers' Club took place in the Mid-Illovo Hall on the 14th May. Mr. H. S. Power, J.P., was in the chair, and there were present, among others, Messrs. B. B. Evans (Vice-Chairman), L. G. Wingfield-Stratford, J.P., Jos. Ballam, P. H. Woolley, W. A. McCullough, R. A. Cockburn, W. E. Antel, J. H. Forshaw, Joseph McCullough (Hon. Treasurer), and A. L. Wingfield (Assistant Hon. Secretary).

The following address was delivered by the Chairman:—

Gentlemen,—It is with pleasure, not altogether unmixed with regret, that I have now to place before you my report as Chairman of the Club for the past year, on this our fifteenth annual meeting. Pleasure, inasmuch as it is impossible not to feel gratified with the individual effort so apparent through the Mid-Illovo and contiguous districts in the increased acreage of mealies and wattles, regret when one considers the paucity of the attendance at our monthly meetings and the lack of combination existing among us generally. As regards this attendance, whilst admitting the exigencies of East Coast Fever, and that some of our members are engaged in Government work, thus rendering them unable to attend the meetings, I do think an effort might be made by others, not

so engaged, to be present more regularly, and then a greater interest in work which must be admitted is for the benefit of the members themselves and the districts they represent.

It is certainly most striking to the observer the fact that some months ago when any reference was made on the notice cards to a discussion with regard to results of interviews with Ministers on the then problematical Mid-Illovo railway, how members turned up in force to participate in these discussions, and the difference in attendance now that the start of the construction of this railway has become an accomplished fact.

I would like to say, gentlemen, that we ought not to consider the railway as the be-all and end-all of our aims, although admittedly a great factor in our future prosperity, but that we have much to learn on improved methods of agriculture, and discussions on this and other matters can but be for our own advancement. Because, apparently, a slackness exists among many other associations in their attendance at meetings and the work done, it appears to me we should show more determination in making ours an exception to the rule.

MEALIES.

This, our staple product, I mention first, and regret to say although, as I have previously stated, an increased acreage has been planted, yet, owing principally to weather conditions, the crop cannot be termed good, and, as far as I can gather from other sources, the same may be said of many other parts of the Colony. Grub has been less in evidence this season than last in the district, and it is to be hoped that the return of better rainy seasons may return its aggressiveness. Another thing I would like to mention with regard to mealies, and that is I consider continuous horse-hoeing of very material advantage to the crop. It is the custom with many farmers to put the horse hoes through two or three times, and then leave the mealie to find for itself. By this procedure the weeds are insufficiently checked, and the mealie suffers. If every farmer would adopt continuous horse hoeing, I am sure the excess of yield would amply repay them for all extra trouble and expense incurred.

While on the subject of mealies, I must refer to the Natal Mealie Growers' Union, whose objects you are all doubtless aware of. Considering the benefits to be derived from membership, the smallness of the fees, 10s., and the possibilities of development in many ways of such an Union, I can only advise every member of this Club to lose no time in sending to the secretaries, Messrs. Duff, Eadie & Mitchell, their secretaries.

WATTLES.

The acreage in our districts appears to be increasing by leaps and bounds, and the remark I think applies to some of the other wattle-growing centres also. The price remains satisfactory, and their seems



CARAVONICA COTTON. 4.

Caravonica Cotton Trees, 18 months old, grown on Mr. Löffler's farm,
Bululwana, Zululand.

(See "Correspondence.")



Caravonica Cotton planted in December with mealies. height now 5 feet



Caravonica Cotton planted in November on Mr. Loffler's farm, Bululwana, Zululand.

CARAVONICA COTTON.—II.

(See " Correspondence.")



RAMIE

Ramie growing on Mr. Toller's farm, Bululwana, Zululand. Three weeks' growth : height, 4 feet

(See " Correspondence. ")

little chance at present of supply exceeding demand, and when one comes to consider the large acreage cut down yearly as against the five to six years' growth required for new plantations, the reason for this maintenance of price seems fairly obvious. With regard to close planting, which now seems to be the order of the day, I cannot but think this is a mistake, and a big one too. I know that some men think the more trees they grow to the acre the bigger will be the return of bark, but I am emphatically of the opinion the reverse is the case. I do not wish to pose as an expert in this matter, but imagine that any thinking man will agree for trees to give of their best they must have sufficient root space and light to admit of them doing so, and I do not see how that is possible by the present system of planting 9 feet by $4\frac{1}{2}$ feet.

EAST COAST FEVER.

Unfortunately this terrible scourge is still with us, and fresh outbreaks are constantly occurring. So far the South African Governments have been unable to find a preventive, and indeed the chances of preventive or therapeutic treatment being discovered seem by no means hopeful. The so-called preventives of Mr. Otto and others have proved miserable failures, many farmers having not only to record the loss of their cattle, but considerable disbursements of hard cash in payment of such preventives. Isolation, cleansing and fencing seem to be the best safeguards we know of at present, and while on this subject I would like to refer to a letter I received from the Government Bacteriologist in answer to one of mine, asking for his advice, and which I am sure he would not mind my referring to under the circumstances. He advocates systematic cleansing, and paddocks being cut up into as small areas as possible, while they are still clean. He suggests one paddock, if possible, as a quarantine paddock for observation purposes, and then should an outbreak occur, temperature, cleanse and remove all the normal cattle into a clean paddock. Should they again break down, repeat the process. By this means, gentlemen, the disease is localised to the paddock in use and, as one can easily see, a man may get hit, and even hit hard, but he stands an exceedingly good chance of saving a large percentage of his herd. I most strongly recommend every man who can follow this advice to do so without delay.

HORSESICKNESS.

This disease, I am glad to say, our districts have been practically free from this season, and there is little reason to doubt that the extra care taken by farmers in smoking their stables is the chief cause of this immunity. One cannot lose sight of the fact that some seasons a district becomes more grossly infected owing to more suitable weather conditions for the breeding of the mosquito. In seasons of this sort continuous stabling, if possible, or, in any case, only having the animals exposed

during sunlight through the sickly period, is the remedy, until such time as a preventive is at our disposal.

RAILWAY.

I am sorry to have to state that owing to details in the construction work the line will probably not be finished as far as Cleveland Hill until August next. This, of course, means increased delay in its arrival at Mid-Illovo Central, and increased worry to all of us with transport difficulties. The only comfort we have is that it cannot be many more months before the railway is with us, and when this time comes I sincerely hope the troubles, which have so adversely handicapped us hitherto in marketing our produce, will become things of the dead and forgotten past.

FERTILISERS.

With regard to this most necessary material, I would suggest that if members of this Club would only combine together and order through the Club, we should undoubtedly be enabled to purchase our requirements at a cheaper rate than we do at present, by buying independently. Other associations do this, and I cannot see why we should not follow in their lines, more especially as after this season we can take delivery here, on rail; in fact, many have already bought on the understanding that the fertilisers will be delivered at Mid-Illovo Station in October next.

OSTRICHES AND RUBBER.

These are two things which have been so much before the public lately that I consider that I am justified in touching upon them, as we have sons to consider in the future as well as ourselves. With regard to the former, there are undoubtedly several farms in these districts that would carry them well. After reading the very interesting report of the Cape Expert on Natal's suitability for ostrich breeding, taken together with the demand for the feathers, which appears to be as safe as most things in this world, the prospects seem very alluring; and I hope that it will not be long before we see ostrich farming carried on around us. The two great things necessary to success, taking for granted that a farm is suitable, appear to be the right class of birds and lucerne feeding.

As regards rubber, I think I may say Ceara is the only one variety presenting possibilities of being grown in Natal and Zululand profitable. The tree will grow well in parts of Zululand, and even in some parts of Natal, where particularly well-sheltered spots are chosen and where frost is a negligible quantity. The one thing we desire further proof about before undertaking on rubber growing, is the free-running of the latex, and unfortunately this proof is not, as yet, forthcoming. Should this once be proved satisfactorily a new industry will arise in those places suitable to the growth of the tree; and many fortunes derived therefrom. In the Mosambique Company's territory the tree is a success, and is

tapped heavily for three days at the beginning and end of the rainy season. These tappings have produced 8 to 9 ounces of rubber from four-year-old trees, and the quantity increases with the age of the tree. What the results from a hundred acre plantation would mean at present prices, or even at a considerable reduction, I leave you to imagine.

NATIVE LABOUR.

Other things I feel ought to have been touched upon, such as tobacco-growing, pig-breeding, tractors, etc., all of which subjects interest us, but my report is, I fear, already too long, and I must close it with a reference to native labour. You are all aware of the trouble experienced through these districts in our inability to obtain sufficient labour during the hoeing of the crop. Johannesburg is, of course, one cause of the shortage, and the other is the continuous daily beer drinks through the summer, and, to a less extent, through the winter. How to surmount the latter trouble I do not clearly see, but I think if such a thing were possible and the Government would bring forward legislation limiting these drinks to one day a week, we might then expect to obtain labour five days out of the six. I certainly consider Government should do something in the matter, as you all know that not only do the Natives neglect their own crops altogether, with the exception of their mabela fields, but the morality for which years ago the Native women and girls were famous is to-day conspicuous by its absence.

Gentlemen, in thanking you for your attendance here to-day, I have also to thank our honorary and assistant hon. secretaries for the able and thorough manner in which they have discharged the onerous duties devolving upon them.

OFFICE BEARERS, 1910-11.

Mr. H. S. Power was unanimously re-elected Chairman, and Mr. P. B. Evans was re-elected Vice-Chairman. Upon the proposition of Mr. R. A. Cockburn, the other officers were re-elected *en bloc*.

Correspondence.

COTTON AND RAMIE AT NONGOMA.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR.—I enclose four photos of cotton and ramie fibre, grown near here which may be of interest to some of your readers, as they give a good idea to what height these can be grown. Unfortunately, the photos are taken a little too soon. If taken a month or six weeks later the cotton trees would show up one mass of white, as they will then be ready for reaping.

The photos are taken on Mr. E. Löffler's farm, on the Bululwana, near the Usutu Kraal.

Number 1 shows some trees on a half-acre patch planted in November, 1908, as an experiment. These grew so well, and the samples of cotton being reported on so favourably by the British Cotton Growers' Association, that Mr. Löffler at once decided to grow on a large scale, with the result that he has now some 60 acres under cotton, most of which was planted between September, 1909, and January, 1910.

Photo number 2 shows a portion of that plantation in December last with mealies, the mealies acting as a shelter for the young plants. The mealies have been reaped and averaged ten bags to the acre; the ground in between was then ploughed up, and the trees are now looking very healthy and stand about 5 feet high.

Photo number 3 shows cotton planted in November last. This promises an exceptionally good yield this year for such young trees; the trees are full of blossom.

The conditions under which cotton can be grown in Zululand are, I should think, the most favourable in the world. We have a warm climate with a good rainfall for about seven months, and just as the cotton is ripening the dry weather set in, and the cotton can be reaped without being damaged.

Cotton-growing is an industry which, I think, should be brought more before the eye of the public, as I am certain there is a big future for it, and in these days when there is so much talk of closer settlement and small farms, cotton growing should be given a trial.

I also enclose a photo, number 4, of a field of ramie fibre on the same farm three weeks old and now standing over 4 feet high. The plants are 18 months old and have been cut down several times. In the summer months they grow to a height of 6 feet in six weeks, and during the summer months can be reaped every six weeks.

According to all accounts, ramie-growing would be a most paying crop with proper machinery for getting out the fibre. I understand that Mr. Löffler has ordered a decorticating machine from England and expects it to arrive daily. If this machine proves a success (and Mr. Löffler is confident it will) he intends putting every available bit of ground under ramie.

I hope to be able to give you further information in a couple of months' time, when the cotton crop is ripe and the ramie machine has been tested.—Yours, etc.,

C. T. V.

Nongoma.

[We reproduce in the present issue of the *Journal* the photos referred to in the foregoing.—Ed.]

THE FARMER BOYS' PAGES.

MONTHLY ARTICLES, NOTES AND PARAGRAPHS ON
ELEMENTARY AGRICULTURAL SUBJECTS

FOR

BEGINNERS IN AGRICULTURE AND STUDENTS GENERALLY.

Conducted by "ARATOR."

* * *Correspondence, whether in the form of notes, comments, or inquiries, is invited from readers, and letters of general interest will be published and replied to in these pages. All communications should be addressed to "ARATOR," C.O. Editor, "Natal Agricultural Journal," Maritzburg*

Fruit Culture.

SOME CHATS FOR BEGINNERS.—II

By "POMUS."

PLANTS obtain their food from the soil by means of their roots. The various substances required for the growth of the plant are dissolved by the water in the soil and held in solution. This water is absorbed by the roots and passes up into the plant or tree, when it is known as "sap." From cell to cell it makes its way upward through the sap-wood until it eventually reaches the leaves. In the leaves the sap is spread out to the light of the sun. Through the pores in the leaves a considerable portion of the sap is evaporated and the residue consequently gets thicker. The atmosphere, as probably everyone knows, contains carbonic acid, and this substance now combines, entering through the leaf-pores, with the oxygen and hydrogen contained in the sap, and this resulting triple compound of carbonic acid, oxygen, and hydrogen undergoes further change—the oxygen of the carbonic acid escaping. Thus elaborated, the sap descends the branches and trunk, and forms a layer of fresh substance between the bark and the wood, called "cambium," most of which becomes new wood, but a small part of which forms new bark.

These facts should be borne in mind whenever any grafting or budding (processes which I shall describe later) is being done. The junction of graft or bud with the stock has to be done in such a way that

the sap from the roots of the stock may flow up through the sap-wood into the new shoot, and so that the cambium of the shoot (in grafting) may coincide with the cambium in the stock.

We have seen that sunlight is required by trees and plants for the purpose of producing the changes in the sap, when it reaches the leaves, necessary to enable it to fulfil its proper functions on returning through the branches and stem of the plant. This fact will make it clear that down to a certain point the fewer leaves a plant has the healthier and more vigorous will it be, and at the same time we have seen that leaves are necessary in order to enable the sap to come under the influence of the sunlight, so that, taking all things into consideration, there must be a point beyond which too many leaves, and below which too few leaves, are equally undesirable. This point in normal conditions is fixed by nature herself, but there are times when a tree loses its leaves as a result of the depredations of some insect pest, and as a consequence the health of the tree suffers. In fruit culture this question of the proportion of leaves is of considerable importance. If the leaves are too thick the fruit will be inclined to be inferior or bitter, since they are unable to ripen fully. Plenty of sunlight must be admitted to the leaves and to the fruit itself in order to obtain the best results, and this is one of the reasons why thinning and pruning are of such importance.

Whilst we are discussing the part played by leaves, reference should be made to the rapidity with which they exhale moisture. I have, of course, just now referred to the fact that moisture is thrown off by the leaves, but what I should like to draw attention to is the practical lesson which is to be deduced from this fact. In transplanting a tree care has to be taken to remove a considerable proportion of the leaves, which, if allowed to remain, would kill the plant by withdrawing from it and throwing off the moisture which it contained, before a fresh supply of moisture could be absorbed by the roots in their new surroundings. For the same reason it is advisable in transplanting to remove a portion of the top of the young tree corresponding as near as possible to the proportion of roots lost in digging out the tree. I shall, of course, discuss the matter of transplanting trees in its proper place, but I thought it would be as well, since we have been talking of the functions of leaves, to point out the reason why leaves must be removed in transplanting young trees.

A few words now about flowers. The object of flowers is to ensure the production of seeds. Surrounded by specialised brightly coloured leaves flowers contain two essential organs, which are in some cases to be found both in the same flowers and in others in different flowers. These two organs are known respectively as the "stamen" and "pistil." At the head of the stamen is what is called the "anther," which contains a powder

called "pollen." The pistil is in essence a tubular structure; the upper end is known as the "stigma," and towards the lower end the tube expands into a sac which contains the rudimentary seeds. When the anthers have matured they burst, and—in the case of flowers in which both the male organs (stamens) and female organs (pistils) are both in the same blossom—the pollen is discharged and falls over the stigma at the upper end of each pistil. By this means the ovules or rudimentary seeds in the sac below are fertilised and seeds are the result. In some cases, as I have said, the stamens and pistils are in different flowers, in which case it is necessary either for the wind to blow the pollen to the pistils or for bees to carry it on their bodies, which they do in seeking for the nectar at the bottom of each flower. The pollen is thus carried from the male flowers to the female flowers, fertilisation takes place, and seeds are the result.

(To be continued.)

Agricultural Chemistry for Beginners.

BY ARCHIBALD PEARCE.

CHAPTER VIII.

POTASH.

IF some fresh wood-ashes are shaken up with a little water, we shall apparently notice that they do not dissolve at all; but let us apply a few tests to try and prove the truth or otherwise of our observation. First, strain off the water through cotton wool or, better still, white blotting paper; we shall obtain a liquid nearly as clear as water. But let us taste it: it has a kind of soapy flavour; test it with red litmus paper, the colour changes to blue; drop a few drops on to hot iron, a whitish deposit remains. We must therefore conclude that wood ashes contain a white alkaline substance which can be dissolved out by water, leaving the larger portion of the ash as an insoluble residue. This substance is one which for many years was manufactured in just this way: in countries where wood is cheap and plentiful, like Russia and Canada, large quantities of timber were collected and burned, the ashes soaked in water and strained off, and the liquid boiled down in large iron pots till only the solid substance remained, and to this the name pot-ash was given. If this potash is treated with an acid, it effervesces and gives off carbon dioxide: it is therefore a carbonate, and we now know that it is the carbonate of the

rare metal potassium. If this potash is boiled with lime, its alkaline properties are very much increased, in reality it has become a new potassium compound called caustic potash, which is made in large quantities for the manufacture of soap and other purposes. Its chemical name is potassium hydrate. Now, unfortunately, the term potash is used very loosely in ordinary language, no less than three different substances being spoken of by the same name, which is confusing and misleading. First, there is the potash which is obtained by washing wood ashes, and which is really the carbonate, as explained: secondly, the hydrate, made by boiling the carbonate with lime, is often spoken of simply as potash; while the compound which properly and correctly has the name of potash given to it is the basic oxide of potassium, from which all the potassium or potash salts are formed. We must remember then that when we speak chemically of potash, we are always referring to this oxide, because we compare the value of all potash salts by calculating how much of this oxide each of them contains.

If the ashes of any plant, or any portion of a plant, are examined, we are always able to detect the presence of potassium in the form of its carbonate, and hence it follows that all plants must have potash salts in some form or other for their growth. But all plants do not require the same amount, nor are all parts of the same plant equally rich in potash. We find that the ashes of the trunk of a tree contain very much less than the same weight of ashes derived from the twigs or leaves. As a general rule the harder and older the parts of a plant are the less potash they contain. Again, some kinds of plants can get on with comparatively little, while others require a large amount. Of plants of the latter kind, the potato is pre-eminent, and this crop may be said never to fail to give an increased return for manuring with potash. Tobacco also has almost always a potash dressing applied to it. Root crops and leguminous crops, too, like a good supply, while cereals only need an application when the soil is very poor in this form of plant-food. On such soils fruit trees are grateful for an additional quantity: it is said to have a tendency to produce a growth of fruit, while nitrogenous manures help to make the trees run to wood. The question then arises as to what soils need potash manuring most. Of course a definite answer with respect to any special soil cannot be given without an analysis, but it is possible to some extent to judge from the character of a soil what the probabilities are. Almost all the potash contained in the soil came originally from the wearing down of a mineral called felspar, which is a constituent of the older rocks like granite and whinstone, and soils derived directly or indirectly from these rocks will generally contain sufficient potash to keep them going, except for special potash-loving crops like potatoes. Such soils are usually clays

or clayey loams. But sandy soils, which consist largely of grains of quartz, are almost always poor in potash, since quartz does not contain any. Moreover they have not so much power as clays of holding soluble salts in their grip, so that the rain does not wash them away, and therefore any potash they may obtain has a tendency to gradually diminish in quantity. Any soil which contains an abundance of decaying organic matter will naturally not be very deficient in potash. There is one rather remarkable point in connection with sheep-farming which is worth noting, and that is that the grease of wool contains nearly half its weight of potash salts, and in the wool-washing districts of France about £100,000 worth is extracted annually from this source. It is therefore to be noted that on a sheep farm large quantities of potash are removed from the soil every year in the wool, and that the soil is more rapidly exhausted of this constituent if grazed by sheep than by other animals.

WOOD ASHES.

There are four substances in use in the Colony which are applied to the soil in order to supply it with potash; these are wood ashes, sulphate of potash, muriate (chloride) of potash, and kainit. The first of these is an excellent manure, if it can be obtained in sufficient quantity, because in addition to the potash it contains all the mineral constituents of the original plant with the exception of the nitrogen, and of these the chief are the lime and phosphoric acid. As has already been pointed out, the value of a potash manure must be decided by the amount of potassium oxide it contains; but that of ashes varies so greatly, both according to the kind of plant they were made of and the soil it was grown on, that it is impossible to give even an average percentage that might represent their value nearly enough for practical purposes. To illustrate this fact, and also that some plants need more potash than others, a few instances are given below, showing the amount of ash and potash contained in it, obtained from 1,000 lbs. of the dried products mentioned:—

	Ash.	Potash.
	lb.	lb.
Pine wood	3½	½
Oak wood	13½	1½
Willow wood	28	2¾
Vines	89	41½
Oat (grain)	29	11
Maize (grain)	15	5½
Oat (straw)	54	10½
Potato (tuber)	43	27

SULPHATE AND MURIATE OF POTASH.

These are concentrated manures, the former containing about 50 per

cent., the latter about 60 per cent., of potash. These are the qualities that have been on sale in the Colony, but lower qualities are made, and a guarantee should always be required in buying. They are at first sight rather costly, but it must be remembered that in buying them one obtains a large quantity of potash in a small bulk, and hence a great deal is saved in freight. The price of both is nearly the same, so that the potash in the muriate is the cheaper. Some agriculturists, however, feel a reluctance to use chlorides (*i.e.*, muriates, see Chap. II.) in any form on their crops, as there may be, in some cases, a danger of harming the plant. In the case of tobacco, there is no doubt that chlorides are harmful. Still, the muriate has been largely used, and with success, so perhaps the danger is rather remote.

KAINIT.

This is a natural mixture of various salts obtained from mines in Germany, containing little potash compared with the other two, only about 13 per cent. Accordingly it takes about 4 tons of kainit to give as much potash as a ton of sulphate, and $4\frac{1}{2}$ tons to equal a ton of muriate. Being sold exactly as it is dug, it is not expensive, but where it has to be carried any distance, the cost of carriage usually makes it cheaper to buy the concentrated salts. The potash exists in kainit in the form of sulphate, the remainder being mainly common salt, about 30 per cent., and the sulphate and chloride of magnesium. It is rather dangerous to apply in contact with the seed, on account of the action of the salt in it; it is said to be very useful for mangolds, which being originally a seaside plant, delight in a little salt.

QUESTIONS.

1. What are the manurial ingredients contained in wood ashes?
2. Why are wood ashes spoiled if left out in the rain?
3. Mention some crops that specially need potash?
4. Name the ordinary potash manures.
5. If kainit costs £3 10s., muriate and sulphate each £15 per ton, which is the cheapest to buy (*i.e.*, from which do you get the most potash for the same money)? Will it make any difference if you live 100 miles from the place of sale, the cost of carriage being 1d. per ton per mile?
6. Why is it dangerous to put kainit in the drills with the seed?
7. What sort of soils stand most in need of potash manure, and which least?
8. What different substances are called potash?
9. What parts of a plant contain most potash?

The critical period in the young turkey's life is generally at an end when six weeks of age.

The Principles of Manuring.

III.—NITRIFICATION.

We have seen that nitrogen occurs in greatest abundance in a "free" condition in the air. This substance occurs in the soil as organic nitrogen, nitric acid, nitrous acid, and ammonia. The largest proportion is to be found in the first of these forms. In order that plants may be able to make use of the nitrogen in the soil, it has to be converted into "nitrates." This process of conversion is termed nitrification, and is brought about by the agency of a micro-organism—or rather two such organisms. The first of these is the nitrous organism, which causes the conversion of ammonia into nitrous acid; the second is the organism which changes the nitrous acid into nitric acid. (The result of the first stage of conversion is the production of nitrites, the second stage produces nitrates.) These two organisms are what are technically known as ferments.

Obviously, this process of nitrification is a very important one from a practical point of view, since it means that unless conditions are favourable for the growth of the organisms which produce these changes in nitrogen, the nitrogen in the soil will not be available for use by plants. We have, therefore now to observe what are the conditions favourable to nitrification.

In the first place, these bacteria cannot develop without a free supply of oxygen, and it therefore follows that, as was stated towards the conclusion of the preceding article, tillage is necessary in soils which are not sufficiently ventilated, so as to admit air freely. It will be apparent, therefore, that a water-logged soil is particularly unfavourable to nitrification. A water-logged soil is, indeed, even more unfavourable to the prosecution of these changes by reason of the fact that its temperature is too low. This brings us to the consideration of another of the conditions which affect the rate at which nitrification takes place. Roughly speaking, in a soil of which the temperature is lower than about 38 deg. Fahr. or above 130 deg. F. no nitrification takes place. When the temperature is between 50 and 100 deg. nitrification is most active. Whilst, however, nitrification cannot continue in a water-logged soil, the presence of a certain amount of moisture is another of the necessary conditions of nitrification. Whilst on the one hand too much water lowers the temperature and excludes air, on the other hand nitrification cannot take place in a dry soil: up to a certain point the more moisture there is in a soil the more rapidly does nitrification take place. Another con-

dition favourable to nitrification is the presence of certain plant food constituents. The presence, for instance, of phosphoric acid is believed to be absolutely essential. There are other constituents which are probably necessary, including potash and magnesia, but no definite conclusions appear yet to have been arrived at in this connection. Again, another necessary condition is the presence of a "base" in the soil with which a combination may be made by the nitric acid. Lime affords the required base, and the soil must therefore be supplied with a certain quantity of carbonate of lime in order to enable nitrification to proceed. At the same time there must not be too much lime—or, in other words, the soil must not be too alkaline—otherwise the process will be retarded. The application of gypsum has the effect of neutralising too great alkalinity, so that if a soil is considered to contain too much lime the application of gypsum will neutralise the ill effects from the point of view of nitrification. Common salt arrests the process of nitrification. Salt is applied often as a manure (it is not really a manure in itself, but it has the effect of releasing the stores of potash in the soil), but when it is so used it should be applied sparingly on account of the retarding effect it has on the process of nitrification.

(To be continued.)

Tests for Students.

SOME USEFUL QUESTIONS AND ANSWERS.

MOISTURE.

Question 1: Why do we need to have moisture in the soil?

Answer: We need to have moisture in the soil because plants cannot grow without water, no matter how much plant food they may have.

Question 2: In what two ways is this water in the soil used?

Answer: (a) To dissolve the plant food in the soil so that it can enter the plant, (b) to help build up plant tissue and maintain the life of the plant.

Question 3: Do growing crops use a large amount of water?

Answer: Yes. Growing crops use a very large amount of water.

Question 4: What is the most common cause of the failure in crops?

Answer: The most common cause of the failure of crops is the lack of sufficient water.

Question 5: What are the three forms of water in the soil?

Answer: (a) Free, (b) capillary, (c) hygroscopic.

Question 5: What do we mean by "free water" in the soil?

Answer: When rain falls on the surface of the earth a part of it sinks into the soil until it reaches a hard layer of earth or rock. This water is the source of supply for springs and wells, and is known as *free water*.

Question 7: What is "capillary water"?

Answer: Capillary water is the water which adheres to the soil particles, or is in the openings between the particles. This water is not controlled by gravity, but passes from one part of the soil to another, which tends to keep the soil in uniform condition as far as moisture is concerned. The capillary water is the direct supply for plants, and should be carefully provided for and saved.

Question 8: What is "hygroscopic water"?

Answer: Hygroscopic water is the water which is held firmly as a film surrounding each particle of soil. It is held so firmly that it is driven off only when the soil is exposed to a temperature of 212 deg. F. This water is of service to plants only during the most excessive droughts.

Question 9: What are "wet lands"?

Answer: Wet lands are lands which contain too much free water. Soils which are dryish and crumbly usually contain sufficient water for the growing of plants. Lands in good condition for the growing of crops are moist, not wet.

Question 10: What is the first step toward utilising the water of the soil?

Answer: The land should be so prepared that the rainfall may be stored. The soil should be put in such condition that it will readily absorb water.

Question 11: How does tillage enable soils to hold moisture?

Answer: Tillage enables soils to hold moisture in two ways—(a) by increasing the depth of the soil, (b) by increasing the capillary power of the soil.

Question 12: What do we mean by conservation of moisture?

Answer: Conservation of moisture means the prevention of the unnecessary waste of capillary water of the soil. It is the saving and using of moisture.

Question 13: What is the advantage of the conservation of moisture?

Answer: The advantage is to make the water which seeks to escape from the surface of the soil pass through cultivated plants.

Question 14: What is the best way to prevent loss of water from the surface of the soil by evaporation?

Answer: Frequent tillage, which loosens the soil to a depth of 5 to 8 centimeters. This dry loose soil acts like a coat or blanket on the surface of the earth. This shallow tillage should be renewed during the growing season as often as the surface of the soil becomes hard or baked.

The Brood Sow.

IN buying a brood sow it is well to note the following points:—

A sow with a good digestion must not only supply the pigs with all they demand at the start, but produce pigs that will take on fat when they are being prepared for market.

A sow's disposition should also be observed. If she is vicious, nervous and disposed to fight the other animals in the pen on slight provocation she will not make a good mother. She may be improved in this respect by care, but the right way is to breed for good disposition.

A nervous sow is not a good flesh producer, and her progeny will carry this failing as well.

A vicious sow is more likely to destroy her own pigs than one with a gentle disposition, and this is a very important matter to consider. While it is true a hog is simply a flesh-producing machine, yet the nervous condition is as much to be considered as any other point.—
(*Agricultural Gazette*, London.)

Dairy Notes.

A NOISY, slow milker may ruin the best of cows.

Liberal feeding is necessary to liberal production.

Nothing adds to the quality of milk and cream like cleanliness in the dairy.

The cow which gives the most milk will not always make the most butter.

Brine washing of bottles may be classed as one of the best improvements in churning.

When the cow is fed a generous ration daily she will not shrink in her milk production until the proper time comes.

Putting the cream into a cold separator is sure to handicap the process of separation so much that much of the cream will go to waste.

In successful dairying the three main essentials are: proper kinds of stock, the greatest care of stock, and proper care of the product.

Usually a month or six weeks is all the average cow needs to rest and recuperate before calving, the time depending somewhat upon her condition. A thin, poor cow needs a longer rest than one in a thrifty condition.

In the case of a dairy cow, if her comfort is ignored, and through

exposure to bad weather she is compelled to draft upon her surplus energy, her entire system must contribute, and therefore her milk flow becomes reduced.

Distinctive Features in Cereal Plants.

HOW TO TELL ONE KIND OF PLANT FROM ANOTHER.

By W. J. MALDEN.

THE young farmer often finds it difficult to distinguish one kind of cereal crop from another until the ear appears: whilst those accustomed to crops in growth can perceive the difference even at considerable distance, the novice finds the difficulty both in respect to the crop as viewed as a whole, and also the parts individually. It is by no means easy to write an explanation of the difference in the appearance of a field of wheat (spring sown), barley or oats: and it is a very good test of descriptive ability to explain the differences verbally even when the three crops are before one. One may say one crop is a darker green than the other; that it looks more shiny, and waves differently as moved by the wind. But darkness of colour is not a definite guide. Wheat is generally of a darker colour than barley; but a field of wheat may be of a much lighter colour than an adjoining piece of barley. It is much a matter of the quantity of nitrogen taken up and the development of chlorophyll. Oats are often very dark green, but may be any shade to a yellow. The relative stiffness of the blade varies with age, so that is not a definite guide. Coming closer, one may notice the fleshy stem of the oat and the somewhat blunt tip to the flag; the corkscrewing of the leaf, particularly in barley, though it may not corkscrew at all. There are many other points one might mention, but practically all have these features more or less in common, or variably at different stages.

THE LIGULE AS A GUIDE.

There is, however, one sure guide for distinguishing wheat, barley, and oats, and that is the shape of the ligule, the usually whitish portion of the leaf where it joins its sheath. Each leaf or flag drops down from the point where it is in contact with the stem; if the flag is pulled gently it will peel down the stem to the next knob. Where the flag joins the stem there is a lightish collar, and the shape of this collar will decide the plant. If the two edges are extended so that the points, whilst embracing the stem, cross one another, and they are hairy, it is wheat; if

they cross, and there are no fine hairs, it is barley. In the case of oats the ligule is so short that the end not only do not overlap, but fail to meet. Thus, if the ligule is examined, there is no doubt as to the kind of cereal, as rye is very distinctive, because it always has a reddish tint near the ground, and the stem is always very narrow just above ground in comparison with the thickness above it. It may be mentioned that the ligule is most correctly distinctive when the uppermost one is examined, though the ligule at either of the lower flags will indicate the plant fairly easily.—(*Agricultural Gazette*, London.)

The Cause of the Germination of Seeds.

It is a matter of common observation that a stage exists in all vegetable life when the vital activities seem to be suspended. In most of the plants with which there is a common familiarity, this stage belongs to the seed. There is a period of dormancy, followed by what is called germination.

This period probably had its origin in the necessity for the provision of a form of protection during the time when the plant was surrounded by untoward conditions, as in winter, or in the dry season. The end of the resting period, as it may be called, came when those conditions were succeeded by others which were favourable. There is the additional consideration that time and opportunity had also been afforded for the wide separation of the embryo plant from its parent, or parents; provision was made for the distribution of the species.

These matters naturally lead to the question which asks what it is within the seed that causes an awakening of life to take advantage of the favourable conditions that occur once again. The answer given by the most careful investigations that have been undertaken up to the present is, that the cause is provided by the ability of the protoplasm in the seed to respond to its surroundings.—(*Agricultural News*, West Indies.)

If the milk from which butter is to be made is all tainted, it, or cream obtained from it, should be pasteurised. This process kills the greater number of the germs present before those specially desired, to bring about the ripening are added to cream. The heating of the milk also causes many volatile taints in the milk to disappear.

Meteorological Returns.

Meteorological Observations taken at the Govt. Stations for the Month of April, 1910.

STATIONS	TEMPERATURE (Fahr. Deg.)				RAINFALL (In Inches)						
	Mean for Month		Maximum for Month	Minimum for Month	Total for Month	No. of Days	Heaviest rainfall in 1 day		Total for Year from July 1, 1909	Total for same period from July 1, 1908	
	Maximum	Minimum					Fall	Day			
Observatory	78.3	62.9	81.4	53.5	2.81	6	1.07	2nd	41.18	33.57	
Stanger	81.9	61.0	92	51	3.37	7	1.35	1st	42.72	35.53	
Verulam	82.2	59.9	98	50	2.65	5	.71	9th	32.83	31.22	
Greytown	78.0	47.5	90	31	1.32	7	.69	17th	31.96	40.06	
Newcastle	83.0	36.1	92	20	.36	3	.20	2nd	31.24		
Lidgerton	77.3	47.9	86	22	1.10	7	.24	17th	39.24	40.13	
Estcourt	76.7	19.4	85	34	1.43	5	.93	18th	29.13	29.27	
Umbogintwini	79.9	60.6	85	48	2.01	9	1.41	2nd	41.31		
Mid-Illovo	76.5	57.8	81	16	1.76	7	.72	2nd	34.67	37.63	
Imbuzana	78.4	60.5	86	50	4.62	9	1.72	3rd	40.13	35.71	
Port Shepstone	78.7	61.5	88	52	2.19	7	1.10	3rd	40.94	35.95	
Umzinto	83.8	51.8	98	49	.97	3	.52	17th	39.95	38.31	
Richmond	75.4	52.4	85	39	1.18	11	.43	17th	40.76	48.63	
Maritzburg	78.4	51.8	86	39	.77	7	.40	17th	38.11	34.39	
Howick	77.3	49.3	86	32	.74	4	.34	17th	31.40	37.27	
Ladysmith	83.9	50.3	92	36	.52	5	.13	1st	27.91		
Dundee	78.1	51.0	85	39	1.90	4	1.26	18th	28.89	38.45	
Weenen	87.9	53.2	98	35	.52	6	.36	17th	25.64	31.01	
Krantzkloof	78.1	50.2	90	49	1.78	10	.39	2nd	38.88	35.14	
New Hanover	81.5	51.2	89	38	1.77	3	1.11	17th	42.31	37.91	
Krantzkop	79.1	50.9	85	19	1.14	5	.39	1st	36.21	30.76	
Nqutu	—	—	—	—	—	—	—	—	—	36.03	
Empangeni	82.1	58.9	91	47	6.52	6	3.12	2nd	50.05	37.73	
Uchombo	74.6	58.3	81	50	3.40	6	1.10	2nd	52.26	41.00	
Mtunzini	81.5	55.2	89	50	9.92	6	5.30	1st	78.82	59.61	
Point	—	—	—	—	4.10	7	.90	2nd	48.19	38.17	
Nottingham Road	73.1	41.2	83	20	.98	7	.53	3rd	29.38	—	
Charlestown	73.2	42.5	81	27	.24	5	.18	15th	31.73	43.89	
Bulwer	—	—	—	—	.77	10	.18	2nd	44.42	55.10	
Isopo	—	—	—	—	.89	6	.36	22nd	33.46	33.11	

Meteorological Observations taken at Private Stations for the Month of April, 1910.

STATIONS	TEMPERATURE (In Fahr. Degr.)		RAINFALL (In Inches)						
	Maximum for Month	Minimum for Month	Total for Month	No. of Days	Heaviest rainfall in 1 day		Total for Year from July 1, 1909	Total for same period from July 1, 1908	
					Fall	Day			
Hilton	85	36	.63	7	.26	17th	37.28	39.51	
P.M.B. Botanical Gardens	82	37	.93	7	.41	17th	31.92	35.30	
Ottawa	—	—	3.02	9	1.05	10th	23.97	31.69	
Mount Edgecombe	—	—	11.87	8	.93	3rd	40.38		
Umzinto, Beneva	—	—	1.92	6	1.06	2nd	39.75	35.63	
Riet Vlei	—	—	1.62	5	1.41	17th	23.94	36.32	
Cedara—Vlei Station	82	29	.73	12	.40	18th	—	—	
Winkel Spruit	85	51	2.60	5	1.38	2nd	49.78	37.60	
Weenen	90	33	.66	5	.41	17th	24.51	—	
Giant's Castle	69.8	47	1.41	5	.76	3rd	41.51	47.14	
Umhlangeni	—	—	2.41	9	1.26	2nd	—	—	
Eshowe	—	—	1.17	6	1.35	3rd	—	—	

Return of Farms at Present under Licence for Lungedekness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNERS.	FARM.
A. P. Caw	Ladysmith	Scab	Natives	Roosboom
			Natives	Rooipoot
			J. Farquhar	Stewart Park
			P. Bantam	Mt. Pleasant
A. B. Koe	Portion of Estcourt		E. Mattison	Calcott
			W. Crouch	Oakhampton
			C. Hastings	Doornkop
			J. Ralfe	Frere
A. C. Williams	Utrecht		C. Libuschagne	Haasdriftein
			G. H. Davel	Klipfontein
			J. B. Davel	Skuishoek
			H. A. Davel	Klipfontein
			P. K. de Jager	Waterval
			W. Steenkamp	Hoekrantz
			A. T. Davel	Klipfontein
			C. Combrink	Waterval
			J. D. van Collier	Klipfontein
			Natives	Goedshoop
			J. T. Clothier	Whitecliff
			Natives	Location No. 2
L. Trener	Alfred	Lungedekness		
E. Wingfield Stratford	Newcastle	Scab		
L. G. Wingfield	Newcastle	Lungedekness		
Stratford	Newcastle	Scab		
			C. Kemp	Highton
			Natives	Tiger Kop
			Messrs. Reynolds	
			and Harvey	Rheebok Vlei
			R. M. Muller	Grootklip
			T. Lazenby	Spriggok
			Natives	Cayon
			M. Withe	Byron
			J. Donovan	Wishoep
			R. D. Barry	Alicedale
			J. Watt	Lombard
			J. Dick	Bernard
			J. Jonbert	Frantzhoek
			G. Adendorff	Bosch Hoek
			B. Vernon	Moodenaagte
			H. W. Schultz	Uitsicht
			H. Shippey	
			Mrs. Webb	Rensburg
			R. P. van Rooyen	Braksluit
			Natives	Mademoiselle
			J. H. Kuy	Vegeberg
			Natives	Trado
			M. B. Curtis	Hilbane
			M. M. Koekemore	Sandrust
			H. J. du Preez	Braksluit
			J. C. du Preez	Goodhope
			J. G. du Preez	Lakoehelle
			Natives	Dalala
				Nagurtonus
				Telzi Hill
				Nqueni
				Itala Hill
			John Mate	
			Petrus Mate	
			P. R. Nel	Vernaak's Kraal
			P. M. van Rooyen	Pampoen Nek
			H. S. Vermaak	Haartebeeste Laagte
			L. M. J. van Rooye	Sweethome
			P. Havemann	Umvoti Port
			P. P. van Rooyen	Doornkloof
			D. P. Naudé	Scottshoek
			Harve & Retallack	Sterkstroom
			A. Jaasen	Sheepridge
			E. G. Wohltz	Stille Rust
			J. Collie	Goudhoek
			S. J. Kemp	Uithoek
			L. E. O. Du Bois	Balgevanie
			J. Dedekind	Elands Berg
			Natives	Crown Lands, Beyela
			A. F. Henderson	Milbrake Feil
			P. Male	Sanham
			J. G. J. Blanche	Vluggewacht
			E. Taylor	Zwartkop Location
			G. L. Combrink	Rooikop
			J. Bekker	Politique

Division of Agriculture & Forestry Notices

FEES FOR AGRICULTURAL ANALYSIS.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experimental Farm, Cedara, in accordance with the following scale of fees, which is subject to revision :—

	Scale I.	Scale II.
	£ s. d.	£ s. d.
FERTILISERS AND FEEDING STUFFS :		
Determination of 1 constituent	0 7 6	0 5 0
Determination of 2 or 3 constituents	0 15 0	0 10 0
Complete analysis	1 1 0	0 15 0
SOILS : Partial analysis of a soil in relation to its fertility	1 1 0	0 10 6
Complete analysis of a soil	2 2 0	1 1 0
WATER : Irrigation and drainage	1 10 0	0 10 6
VEGETABLE PRODUCE : Fodder, Ensilage, Grain, &c.	1 10 0	0 15 0
MILK, CREAM, BUTTER : Fat only	0 5 0	0 2 6
" " : Complete	0 15 0	0 7 6
WATTLE BARK AND TEA : Tannin	0 5 0	0 2 6
CATTLE DIPPS : Quantitative analysis of 1 to 3 principle constituents	0 10 0	0 5 0
INSECTICIDES :		
Qualitative analysis each constituent	0 5 0	0 2 6
Quantitative " " "	0 10 3	0 5 0

Scale No. 1 is applicable to samples handed in by merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Director, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis performed by it; and, where such is deemed of sufficient public interest, it will remain at the discretion of the Director to remit any charges hereunder.

TREES FOR SALE.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casaurinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 6d. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders cannot be accepted for a smaller number than 100 trees.

PURCHASE OF TREE SEEDS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for sale. Not less than one pound will be purchased; and a specimen bearing seed vessels or flowers should be sent for identification purposes.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

POULTRY.

Cockerels and a few Pullets of the following breeds for sale:—Buff Orpingtons Wyandottes, Plymouth Rocks and Black Leghorns.

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

WOOLLED SHEEP.

Offers are invited for young imported Rams being Rambouillet Merinos, Lincolns, Hampshires, Shropshires. Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible:—

Admittance of Students to the School of Agriculture. —House Master, Cedara.
Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.
Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.
Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.
Agricultural Seed, Livestock, etc.—Farm Manager, C.X.F., Cedara.
Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.
Agricultural Seeds, etc., for Irrigation Farming.—Curator, Govt Station, Weenen.
Fruit.—Orchardist, Cedara.
Accounting Business.—Accounting Clerk, Cedara.
Woolled Sheep, Woolled Classings, &c.—Wool Expert, Cedara.
Apiculture — Aviarist, Cedara.

E. R. SAWER,

Director, Division Agriculture and Forestry, Cedara.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Employment Bureau.

The Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 126.—Colonial, 35 years of age, desires to obtain a position as overseer or manager of an ostrich farm. Has been for some years with first-class farmers, and had charge of some of the best birds in the Cape Colony. Has a practical knowledge of incubating, rearing of chicks, dosing and general management.

No. 127.—An expert fruit packer of four years' experience in Spain and France, and twenty years Colonial experience, is open to accept an engagement after 25th April next. He is open to accept low wages, with board and lodging, and fare to and from the Cape where he is at present.

No. 128.—Wishes to secure employment on a farm. States that he has a general knowledge of engineering, and has been employed on a large and well-known farm in the Richmond Division.

No. 131.—Age 20. Was a student at College of Agriculture, Cape Colony, where he gained a diploma. Has also won prizes for butter making at the Rosebank and Port Elizabeth Shows. Has been in the services of the Orangia Creamery Co., Bethlehem, which he left on account of conditions of employment not being suitable to his requirements.

No. 132. Age 37. Has had nine years experience as Assistant and Manager on Tea Estate in Assam, and has a thorough practical knowledge of tea making in all its Departments. Would like to obtain an appointment in a Tea Garden in Natal. Has a knowledge of several Indian languages.

No. 133.—Desires appointment as Farm Manager. Has had a thorough knowledge of growing and packing fruit, also lucerne growing and hay making. Has also had experience in Ostrich and Stock farming.

No. 134.—Age 37. Wishes to obtain experience on an Ostrich farm for a year. Would be willing to invest £700 at the end of the term of probation, and on the expiry of a year's partnership would be willing to increase that sum to £1,000.

No. 135.—Age 35. Has a knowledge of poultry and bee-keeping. Total abstainer. Non-smoker. Good references. Is anxious to get on to a farm.

No. 136.—Wishes to secure employment on an Ostrich farm. Very good references.

No. 137.—Understands carpentry and wagon making. Is anxious to secure a position on a farm.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any

but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

EMPLOYMENT FOR GIRLS.

The Minister of Agriculture has received a letter from the Chairman of the Transvaal Land Settlement Board, stating that he has been asked by several correspondents in England if there are any openings in South Africa, such as in creameries, for girls trained at Bromsgrove Colonial College and other such training centres in England. We should be glad to hear from any institutions or farmers in Natal who may be in a position to offer situations to girls who have been trained at such Colleges, when we shall be pleased to place them in communication with the Chairman of the Transvaal Land Settlement Board.

Agricultural and Other Shows, 1910.

CAMPERDOWN (Camperdown Agricultural Society).—Show, 22nd July. Walker and Burchell, Camperdown, *Secretaries*.

DUNDEE (Dundee Agricultural Society).—Show, 23rd and 24th June. Late entries, 22nd June. J. McKenzie, Box 105, Dundee, *Secretary*.

DURBAN (Durban and Coast Society of Agriculture and Industry).—Show, 6th, 7th and 8th July. J. Morley, 399, Smith Street, Durban, *Secretary*.

DURBAN (Durban County Farmers' Association).—Hold no Show, but an Exhibit will be arranged for at the Show held by the Durban and Coast Society of Agriculture and Industry. F. J. Volett, New Germany, *Secretary*.

DURBAN (Durban and Coast Poultry Club).—Show 6th, 7th and 8th July. H. M. Fletcher, 20, Castle Arcade, Durban, *Secretary*.

ESTCOURT (Weenen Agricultural Society).—Show, 21st and 22nd June. E. Cauterley, Estcourt, *Secretary*.

GREYTOWN (Umvoti Agricultural Society).—Show, 8th June. W. H. Gibbs, Box 24, Greytown, *Secretary*.

GREYTOWN (Umvoti Farmers' Association).—Date not yet fixed. C. J. Nel, Greytown, *Secretary*.

LADYSMITH (Klip River Agricultural Society).—Show, 10th and 11th June. W. J. Teasdale, Ladysmith, *Secretary*.

MID-ILLOVO (Mid-Illovo Farmers' Club).—Show held under the Mid-Illovo Agricultural Society. J. W. V. Montgomery, Ismont, Mid-Illovo, *Secretary*.

NEW HANOVER (New Hanover Agricultural Association).—Show, 18th August. W. D. Stewart, New Hanover, *Secretary*.

PIETERMARITZBURG (Royal Agricultural Society).—Show, 16th, 17th and 18th June. Duff, Eadie & Co., Timber Street, Pietermaritzburg, *Secretaries*.

PIETERMARITZBURG (Natal Poultry Club).—Show, 16th, 17th and 18th June, in conjunction with the Royal Agricultural Society's Show. E. G. Blundell, Box 250, *Secretary*.

RICHMOND (Richmond Agricultural Society).—Show 20th July. Entries close, 30th June. C. Williams, *Secretary*.

STANGER (Victoria County Agricultural Society).—Show, 29th June. H. C. Smith, Stanger, *Secretary*.

SOCIETIES HOLDING NO SHOWS.

Byrne Farmers' Association; Boston Farmers' Association; Donnybrook Farmers Association; Dronk Vlei Farmers' Association; Garden Castle Farmers' Club; Greytown Horticultural Society; Ladysmith Farmers' Association; Malton Farmers' Association; Pofela Agricultural Society; Seven Oaks Farmers' Association; Umsinga-Biggarsburg Farmers' Association; Utrecht Boeren Vereeniging; Vryheid Agricultural Society.

Frere Dipping Association; Alfred County Farmers' Association and Agricultural Society.

Farm Apprentices' Bureau.

The following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

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| No. 3. | Age 24. | Colonial born. Has a knowledge of bookkeeping. |
| „ 15. | Age 19. | Is desirous of learning farming. |
| „ 25. | Age 23. | Bricklayer by trade. Is anxious to get on a farm. |
| „ 27. | Age 19. | Has had one year's experience on a farm in the Cape Colony. |
| „ 35. | Age 21. | Has had five years' experience on farms. Understands cattle and horses and Agriculture. Is anxious to get back on a farm. |
| „ 40. | Age 24. | Has had a little experience of farm life. Understands bee-keeping. Is anxious to get on a farm. |
| „ 46. | Age 21. | Served a term of apprenticeship to a firm of agricultural implement makers. Industrious and level-headed lad. Very good references. |
| „ 47. | Age 21. | Is anxious to obtain a situation on a farm. Has been in ironmongery trade for 2½ years. |
| „ 49. | Age 21. | Colonial born. Has had three years' experience on farms, two years in the Mooi River Division and one year dairy farming in the Transvaal. Good references. Speaks Zulu. |
| „ 53. | Age 17. | Has had 18 months' experience of farming in Zululand. Speaks Zulu. Understands cattle and horses. |
| „ 54. | Age 18. | Has had 18 months' experience of farming at Harrismith. Speaks Zulu and Dutch. Understands cattle and horses. Is anxious to get back on a farm. |
| „ 55. | Age 16. | Has had a little experience. Speaks Zulu. Understands carpentry. Has been engaged in a Solicitor's office for four years. Is very obliging and willing. Anxious to get on to a farm. |
| „ 56. | Age 20. | Strong, tall and healthy, good rider, fond of stock, and has had some years' experience of general farming. Small salary required with board and lodging. |

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndvedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Unlazi Location (Upper Unikomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

Charges in respect of Cattle and the Meat of Cattle.	Calves up to one year old.	Cattle over one year old.	
		Rate per single head.	After reaching 100 head in month.
<i>Abattoir.</i>	s. d.	s. d.	s. d.
1. Receiving, per head...	0 3	0 6	0 3
2. Killing and Dressing, per head...	2 0	3 0	2 0
3. Disinfectants ...	0 1	0 1	0 1
4. Cleaning Tripes, each ...	0 6	0 6	0 6
5. „ Sets Feet, per set ...	0 6	0 6	0 6
6. „ Cattle Heads, each ..	0 9	—	—
<i>Bagging Charge</i>			
1. Per Body of Beef ...	1 3	2 6	1 9
2. Bagging Labour, per body ...	0 3	0 6	0 3
Hessian, 3d. per yard.			
<i>Special Storage Rates for Chilling up to 72 hours.</i>			
1. Chilling Beef, per body ...	1 3	2 9	1 9
2. Chilling Offal, per set ...	0 6	1 0	0 6

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg, 21st December, 1908.

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the Fund, Colonial Offices, Pietermaritzburg.

All Correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

I. A. R. I. 75.

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